PCI Hot Plug

User’s Guide I/O devices edition

FUJITSU

Preface

-Purpose

This manual describes the procedure of exchanging or extending file PCI cards and network PCI cards using the PCI Hot Plug feature.

-Intended Readers

This manual is intended for the following readers:

System software developers and test engineers

System support engineers

System administrators who uses this function

Hardware engineers who uses this function

-Organization

This manual is organized as follows:

"Chapter 1 PCI cards with support for PCI Hot Plug" describes the lists of PCI cards supporting PCI Hot Plug.

"Chapter 2 Overview of replacement and extension of PCI cards" describes the outline of a procedure of replacement and extension of PCI cards.

"Chapter 3 File devices" describes the detailed procedure of PCI Hot Plug about file devices.

"Chapter 4 Network devices" describes the detailed procedure of PCI Hot Plug about network devices.

"Chapter 5 Notes for PCI Hot Plug" describes the notes when using PCI Hot Plug.

-Notation Used

The following shows the notation conventions used in this manual.

In this manual, the Solaris(TM) Operating Environment is abbreviated to Solaris OE, the Solaris(TM) 8 Operating Environment is abbreviated to Solaris 8 OE, the Solaris(TM) 9 Operating Environment is abbreviated to Solaris 9 OE. the Solaris(TM) 10 Operating Environment is abbreviated to Solaris 10 OE.

The titles of chapters are enclosed in parentheses ("").

Example: See "Chapter1 PCI cards supporting PCI Hot Plug "

Commands and other input use the following prompts:

C shell prompt:

prompt%

Bourne and korn shell prompt:

prompt$

Super user prompt:

#

Commands entered by the user is shown in bold:

cfgadm -c configure pcipsy2:R0B00-PCI#slot01<Return>

Key combinations are represented, for example, by CTL-C, which means to simultaneously press the Control and C key.

-Reference Manuals

If necessary, refer to the following manuals:

PCI Hot Plug User's Guide

Dynamic Reconfiguration User's Guide

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Notes

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Chapter 1 PCI cards with support for PCI Hot Plug

This chapter shows the list of PCI cards supporting PCI Hot Plug feature. The driver patches and the option driver packages enclosed with a PCI card in this chapter can be downloaded from the following URLs.

The driver patches

http://software.fujitsu.com/en/security/index.html

The option driver packages enclosed with a PCI card

http://primepower.fujitsu.com/en/driver/e_index.html

Please contact our customer service about the latest information of the driver patches and the option driver packages.

1.1 PCI cards for file devices

The following list describes the PCI cards that support PCI Hot Plug for file devices. Please ask the sales staff about the latest information of PCI Hot Plug supporting cards.

Functions	Product ID	Software of driver (driver name)	Operating clock (*1)	Supporting Functions		Redundant Software
				Hot replacement	Hot expansion	
SCSI	X6540A-U	Solaris OE (glm) **(*2)**	33MHz	NG **(*3)**	NG **(*3)**	none
	X6541A-U X6541A-X	Solaris OE (glm) **(*2)**	33MHz	NG **(*4)**	OK **(*10)**	*Multipath Disk Control 2.2.1 or later **(*5)** *GR Multipath Driver 1.0.1 or later
	GP7B8SC1U GP7B8SC1X	Solaris OE (glm) **(*2)**	33MHz	OK**(*11)**	OK	*Multipath Disk Control 2.2.1 or later **(*5)** *GR Multipath Driver 1.0.1 or later
	PP028SC1U PP028SC1X	FUJITSU PCI SCSI Adapter Driver 1.0 or later (enclosed with a PCI card)	33MHz	OK	OK	none
	PW008SC3	Solaris OE (fjulsa)	33MHz / 66MHz	NG **(*3)**	NG **(*3)**	none
		FUJITSU ULTRA LVD SCSI Host Bus Adapter Driver 1.0 or later (enclosed with a PCI card)	33MHz / 66MHz	NG **(*3)**	NG **(*3)**	none
Fibre Channel	GP7B8FC1U	FUJITSU PCI Fibre Channel 2.2 or later (enclosed with a PCI card) **(*6)(*7)(*9)**	33MHz	OK	OK	*Multipath Disk Control 2.2.1 or later **(*5)** *GR Multipath Driver 1.0.1 or later
	PW008FC2U	FUJITSU PCI Fibre Channel 2.2.1 or later (enclosed with a PCI card) **(*7) (*9)**	33MHz / 66MHz	OK	OK	*Multipath Disk Control 2.2.1 or later **(*5)** *GR Multipath Driver 1.0.1 or later

Functions	Product ID	Software of driver (driver name)	Operating clock (*1)	Supporting Functions		Redundant Software
				Hot replacement	Hot expansion	
	PW008FC3U	FUJITSU PCI Fibre Channel 2.2.1 Update2 or later (enclosed with a PCI card) **(*9)**	33MHz / 66MHz	OK	OK	*Multipath Disk Control 2.2.1 or later **(*5)** *GR Multipath Driver 1.0.1 or later
	PW028FC4S PW028FC4U	Emulex LightPulse FC SCSI/IP 6.01f or later**(*13)**	33MHz/ 66MHZ	OK	OK	**(*8)**
	PW028FC5S PW028FC5U	Emulex LightPulse FC SCSI/IP 6.01f or later**(*13)**	33MHz/ 66MHZ	OK	OK	**(*8)**

(*1) Please refer to "2.1.1.2 PCI Hot Plug configure operation" of the "PCI Hot Plug User's Guide" about the operating clock of PCI cards and PCI slots.
(*2) In case of using Solaris 8 OE, patch 109885-09 or later is needed.
(*3) Replacement and expansion are not supported due to hardware specifications.
(*4) Replacement is not supported due to hardware specifications.
(*5) Multipath Disk Control load balance option is not supporting PCI Hot Plug.
(*6) If using Solaris 9 OE, it is necessary to apply the "FUJITSU PCI Fibre Channel 2.2 (patch level 08) or later.
(*7) In case of using FUJITSU PCI Fibre Channel 2.2, patch 910936-13 or later is needed. And in case of using FUJITSU PCI Fibre Channel 2.2.1, patch 912069-09 or later is needed.
(*8) Redundant software should support Dynamic Reconfiguration function.
(*9) In case of using Solaris 10 OE, FUJITSU PCI Fibre Channel 3.0 or later is needed.
(*10) When connecting a shared device with a cluster system, please attach the shared device to the system after connecting the PCI card and the shared device with each node of the cluster system.
(*11) When a shared device is connected with a cluster system, it is necessary to stop the use of the shared device from the operation node of the cluster system.
(*12) When using Solaris 8 OE, the patch 114632-04 or later is needed.
When applying the patch 114632-04 or later, if the patch 912773-02 or later has applied, it is necessary to remove the patch.
(*13) This product is not supporting Solaris 10 OE in March 2005.

1.2 PCI cards for network devices

The following list shows the PCI cards that support PCI Hot Plug for network devices. When using below PCI cards, please refer to "5.1.1 Network driver configuration changing". Please ask the sales staff about the latest information of PCI Hot Plug supporting cards.

Functions	Product ID	Software of driver (driver name)	Operating clock (*1)	Supporting Functions		Redundant Software (*13)
				Hot replacement (*2)	Hot extension	
Ethernet	X1033A-U X1033A-X	Solaris OE (hme)	33MHz	OK	OK	*SynfinityLink 2.2 **(*3)** *PRIMECLUSTER GLS 4.0 or later **(*4)**
	PW008FE1	FUJITSU PCI 10/100 Ethernet 1.0 or later (enclosed with a PCI card) **(*5)**	33MHz	OK	OK	*SynfinityLink 2.2 **(*3)** *PRIMECLUSTER GLS 4.0 or later **(*4)**
	PW008QE1	FUJITSU PCI Quad 10/100 Ethernet 1.0 or later (enclosed with a PCI card) **(*6)**	33MHz	OK	OK	*SynfinityLink 2.2 **(*3)** *PRIMECLUSTER GLS 4.0 or later **(*4)**
	PW008QE2	FUJITSU PCI Quad 10/100 Ethernet 1.1 or later (enclosed with a PCI card) **(*12)**	33MHz	OK	OK	*SynfinityLink 2.2 **(*3)** *PRIMECLUSTER GLS 4.0 or later **(*4)**

Functions	Product ID	Software of driver (driver name)	Operating clock (*1)	Supporting Functions		Redundant Software (*13)
				Hot replacement (*2)	Hot extension	
	PP028GE1U	FUJITSU PCI Gigabit Ethernet 1.4.1 or later (enclosed with a PCI card) **(*7)**	33MHz / 66MHz	OK	OK	*SynfinityLink 2.2 **(*3)** *PRIMECLUSTER GLS 4.0 or later **(*4)**
	PW008GE1	FUJITSU PCI Gigabit Ethernet 1.4.1 or later (enclosed with a PCI card) **(*7)**	33MHz / 66MHz	OK	OK	*SynfinityLink 2.2 **(*3)** *PRIMECLUSTER GLS 4.0 or later **(*4)**
	PW008GE4	FUJITSU PCI Gigabit Ethernet 2.0 or later (enclosed with a PCI card) **(*8) (*9)**	33MHz / 66MHz	OK	OK	*SynfinityLink 2.2 **(*3)** *PRIMECLUSTER GLS 4.0 or later **(*4)**
	PW008GE5	FUJITSU PCI Gigabit Ethernet 2.0 or later (enclosed with a PCI card) **(*8) (*9)**	33MHz / 66MHz	OK	OK	*SynfinityLink 2.2 **(*3)** *PRIMECLUSTER GLS 4.0 or later **(*4)**
ATM	GP7B8AT1U GP7B8AT1X	FUJITSU PCI ATM 1.2 or later (enclosed with a PCI card) **(*14)**	33MHz	OK	NG **(*10)**	*SynfinityLink 2.2 **(*3)** *PRIMECLUSTER GLS 4.0 or later **(*4)**
InfiniBand**(*11)**	PW028SY1	BLASTBAND 1.0 or later	66MHz	OK	OK	*PRIMECLUSTER GLS 4.1A20 or later

(*1) Please refer to "2.1.1.2 PCI Hot Plug configure operation" of the "PCI Hot Plug User's Guide" about the operating clock of PCI cards and PCI slots.
(*2) In case of replacing PCI card, the PCI card with which the network interface is not once activated from the time of system booting cannot be exchanged.
(*3) The replacement and expansion are supported only on the Redundant Line Control Function.
(*4) When using the PRIMECLUSTER GLS 4.0, the replacement and expansion are supported only on the Redundant Line Control Function.
(*5) It is necessary to apply the patch 912785-05 or later. Please contact our customer service about the latest patch.
(*6) When using the "FUJITSU PCI Quad 10/100 Ethernet 1.0," it is necessary to apply the patch 912216-09 or later. Please contact our customer service about the latest patch.
(*7) It is necessary to apply the driver version 1.4.1 or later and the patch 912214-03 or later. Please contact our customer service about the latest patch.
(*8) When using Solaris 8 OE, it is necessary to apply the patch 114536-03 or later. Please contact our customer service about the latest patch.
When applying the patch 114536-03 or later, if the patch 912314-01 or later has applied, it is necessary to remove the patch. When removing the patch 912314-01 or 912314-02, the /platform/sun4us/kernel/drv/fjgi.conf file, which defines fjgi interface settings, will be replaced. If you have edited fjgi.conf, please make a backup copy of fjgi.conf beforehand and pick up your own settings and add them to the new one after removing the patch if necessary.
(*9) When using Solaris 9 OE, it is necessary to apply the patch 114994-03 or later. Please contact our customer service about the latest patch.
When applying the patch 114994-03 or later, if the patch 912660-01 or later has applied, it is necessary to remove the patch. When removing the patch 912660-01 or 912660-02, the /platform/sun4us/kernel/drv/fjgi.conf file, which defines fjgi interface settings, will be replaced. If you have edited fjgi.conf, please make a backup copy of fjgi.conf beforehand and pick up your own settings and add them to the new one after removing the patch if necessary.
(*10) System rebooting is needed for hot extension.
(*11) When PCI card is InfiniBand, please refer to "BLASTBAND GUIDE" for the procedure for replacement and expansion.
(*12) Patch 913294-03 or later is needed.
(*13) Redundant software is not supported on Solaris 10 OE.
(*14) In case of using Solaris 10 OE, FUJITSU PCI ATM 1.3 or later is needed.

Chapter 2 Overview of replacement and extension of PCI cards

This chapter describes the outline of a procedure of replacement and extension of PCI cards by using PCI Hot Plug.

2.1 Replacement of PCI card

This section describes outline to exchange PCI cards using PCI Hot Plug feature.

About software which makes PCI card redundantly, please refer to each manual of the software.

2.1.1 Replacement of PCI cards on non-redundant system

Before you exchange PCI cards without redundant software, you must stop applications which using the PCI cards. The replacement procedure of PCI cards is as follows.

Please refer to "Chapter 3 File devices" or "Chapter 4 Network devices" about detailed replacing procedure of PCI cards.

File devices procedures

1. Stop the hardware monitoring of the Machine Administration
   Stop the hardware abnormal monitoring of the Machine Administration.
2. Stop the daemons
   If you use the Fibre Channel Card (PW028FC4/PW028FC5), stop the daemons.
3. Specify the replacing PCI card
   Specify the devices and interfaces that are influenced by replacing PCI cards.
4. Stop applications
   Stop services and high layer products that are influenced by replacing PCI cards.
5. Disconnect the PCI card
   It changes into the state where the PCI card is exchangeable.
6. Replace the PCI card
   Replace the PCI card.
7. Connect the PCI card
   It changes into the state where the PCI card is usable.
8. Start applications
   Start high layer products and services used by the replaced PCI card.
9. Start the daemons
   If you use the Fibre Channel Card (PW028FC4/PW028FC5), start the daemons.
10. Start the hardware monitoring of the Machine Administration
    Update the hardware configuration information, and restart the hardware abnormal monitoring of the Machine Administration.

Network devices procedures

1. Stop the hardware monitoring of the Machine Administration
   Stop the hardware abnormal monitoring of the Machine Administration.
2. Specify the replacing PCI card
   Specify the devices and interfaces that are influenced by replacing PCI cards.
3. Stop applications
   Stop services and high layer products that are influenced by replacing PCI cards.
4. Disconnect the PCI card
   It changes into the state where the PCI card is exchangeable.
5. Replace the PCI card
   Replace the PCI card.
6. Connect the PCI card
   It changes into the state where the PCI card is usable.
7. Start applications
   Start high layer products and services used by the replaced PCI card.
8. Start the hardware monitoring of the Machine Administration
   Update the hardware configuration information, and restart the hardware abnormal monitoring of the Machine Administration.

2.1.2 Replacement of PCI cards on redundant system

When exchanging PCI cards with redundant software, it is possible to exchange PCI cards without stopping services and applications. The replacement procedure of PCI cards is as follows.

Please refer to "Chapter 3 File devices" or "Chapter 4 Network devices" about detailed replacing procedure of PCI cards.

File devices procedures

1. Stop the hardware monitoring of the Machine Administration
   Stop the hardware abnormal monitoring of the Machine Administration.
2. Stop the daemons
   If you use the Fibre Channel Card (PW028FC4/PW028FC5), stop the daemons.
3. Specify the replacing PCI card
   Specify the devices and interfaces that are influenced by replacing PCI cards.
4. Disconnect from redundant system
   Disconnect the devices path and interfaces of PCI cards from the redundant system.
5. Disconnect the PCI card
   It changes into the state where the PCI card is exchangeable.
6. Replace the PCI card
   Replace the PCI card.
7. Connect the PCI card
   It changes into the state where the PCI card is usable.
8. Connect to redundant system
   Connect device paths and interfaces of the replaced PCI card to the redundant system.Switch back the online path if needed.
9. Start the daemons
   If you use the Fibre Channel Card (PW028FC4/PW028FC5), start the daemons.
10. Start the hardware monitoring of the Machine Administration
    Update the hardware configuration information, and restart the hardware abnormal monitoring of the Machine Administration.

Network devices procedures

1. Stop the hardware monitoring of the Machine Administration
   Stop the hardware abnormal monitoring of the Machine Administration.
2. Specify the replacing PCI card
   Specify the devices and interfaces that are influenced by replacing PCI cards.
3. Disconnect from redundant system
   Disconnect the devices path and interfaces of PCI cards from the redundant system.
4. Disconnect the PCI card
   It changes into the state where the PCI card is exchangeable.
5. Replace the PCI card
   Replace the PCI card.
6. Connect the PCI card
   It changes into the state where the PCI card is usable.
7. Connect to redundant system
   Connect device paths and interfaces of the replaced PCI card to the redundant system.
8. Switch back the redundant path
   Switch back the online path if needed.
9. Start the hardware monitoring of the Machine Administration
   Update the hardware configuration information, and restart the hardware abnormal monitoring of the Machine Administration.

2.2 Extension of PCI cards

This section describes outline to extend PCI cards using PCI Hot Plug feature.

About software which makes PCI card redundantly, please refer to each manual of the software.

2.2.1 Extension of PCI cards on non-redundant system

When not using the redundant configuration software, the extension procedure of PCI cards is as follows.

Please refer to "Chapter 3 File devices" or "Chapter 4 Network devices" about detailed extending procedure of PCI cards.

File devices procedures

1. Setup I/O devices which will be added to system
   Setup devices which will be added to system in the case of file devices on Solaris 8 OE.
2. Stop the hardware monitoring of the Machine Administration
   Stop the hardware abnormal monitoring of the Machine Administration.
3. Stop the daemons
   If you use the Fibre Channel Card (PW028FC4/PW028FC5), stop the daemons.
4. Add PCI cards
   Extend PCI cards.
5. Connect PCI cards
   It changes into the state where the PCI card is usable.

6. Start the daemons
   If you use the Fibre Channel Card (PW028FC4/PW028FC5), start the daemons.
7. Start the hardware monitoring of the Machine Administration
   Update the hardware configuration information, and restart the hardware abnormal monitoring of the Machine Administration.
8. Preparation to recognize devices for Fibre Channel
   If you use SAN management function, preparation to recognize devices.
9. Set up driver
   a. Add the driver configuration of PCI cards
      Add the driver configuration of PCI cards
   b. Add the configuration of device driver
      Add the configuration of device driver in the case of file devices.
10. Setup applications
    Configure the high layer products and services about extended PCI cards.
11. Start applications
    Start high layer products and services used by the replaced PCI card.

Network devices procedures

1. Setup I/O devices which will be added to system
   Setup devices which will be added to system in the case of file devices on Solaris 8 OE.
2. Stop the hardware monitoring of the Machine Administration
   Stop the hardware abnormal monitoring of the Machine Administration.
3. Add PCI cards
   Extend PCI cards.
4. Connect PCI cards
   It changes into the state where the PCI card is usable.
5. Start the hardware monitoring of the Machine Administration
   Update the hardware configuration information, and restart the hardware abnormal monitoring of the Machine Administration.
6. Connect equipment to PCI cards
   Connect equipment to PCI cards.
7. Set up driver
   a. Add the driver configuration of PCI cards
      Add the driver configuration of PCI cards
   b. Add the configuration of device driver
      Add the configuration of device driver in the case of file devices.
8. Setup applications
   Configure the high layer products and services about extended PCI cards.
9. Start applications
   Start high layer products and services used by the replaced PCI card.

2.2.2 Extension of PCI cards with new redundant system

The procedure of using the extended PCI card and establishing a new redundant configuration is as follows.

Please refer to "Chapter 3 File devices" or "Chapter 4 Network devices" about detailed extending procedure of PCI cards.

File devices procedures

1. Setup I/O devices which will be added to system
   Setup devices which will be added to system in the case of file devices on Solaris 8 OE.
2. Stop the hardware monitoring of the Machine Administration
   Stop the hardware abnormal monitoring of the Machine Administration.
3. Stop the daemons
   If you use the Fibre Channel Card (PW028FC4/PW028FC5), stop the daemons.
4. Add PCI cards
   Extend PCI cards.
5. Connect PCI cards
   It changes into the state where the PCI card is usable.
6. Start the daemons
   If you use the Fibre Channel Card (PW028FC4/PW028FC5), start the daemons.
7. Start the hardware monitoring of the Machine Administration
   Update the hardware configuration information, and restart the hardware abnormal monitoring of the Machine Administration.
8. Preparation to recognize devices for Fibre Channel
   If you use SAN management function, preparation to recognize devices.
9. Setup driver
   a. Add the driver configuration of PCI cards
      Add the driver configuration of PCI cards

b. Add the configuration of device driver
Add the configuration of device driver in the case of file devices.

10. Setup redundant system
Configure the environmental configuration of a new redundant system and activate.
11. Setup applications
Configure the high layer products and services about a new redundant system.
12. Start applications
Start high layer products and services used by the new redundant system

Network devices procedures

1. Setup I/O devices which will be added to system
Setup devices which will be added to system in the case of file devices on Solaris 8 OE.
2. Stop the hardware monitoring of the Machine Administration
Stop the hardware abnormal monitoring of the Machine Administration.
3. Add PCI cards
Extend PCI cards.
4. Connect PCI cards
It changes into the state where the PCI card is usable.
5. Start the hardware monitoring of the Machine Administration
Update the hardware configuration information, and restart the hardware abnormal monitoring of the Machine Administration.
6. Connect equipment to PCI cards
Connect equipment to PCI cards.
7. Setup driver
    a. Add the driver configuration of PCI cards
    Add the driver configuration of PCI cards
    b. Add the configuration of device driver
    Add the configuration of device driver in the case of file devices.
8. Setup redundant system
Configure the environmental configuration of a new redundant system and activate.
9. Setup applications
Configure the high layer products and services about a new redundant system.
10. Start applications
Start high layer products and services used by the new redundant system.

2.2.3 Extension of PCI cards to redundant system

When extending PCI cards to the existing redundant system, it is possible to extend PCI cards without stopping services and applications. The extension procedure of PCI card to existing redundant system is as follows.

File devices procedures

1. Setup I/O devices which will be added to system
Setup devices which will be added to system in the case of file devices on Solaris 8 OE.
2. Stop the hardware monitoring of the Machine Administration
Stop the hardware abnormal monitoring of the Machine Administration.
3. Stop the daemons
If you use the Fibre Channel Card (PW028FC4/PW028FC5), stop the daemons.
4. Add PCI cards
Extend PCI cards.
5. Connect PCI cards
It changes into the state where the PCI card is usable.
6. Start the daemons
If you use the Fibre Channel Card (PW028FC4/PW028FC5), start the daemons.
7. Start the hardware monitoring of the Machine Administration
Update the hardware configuration information, and restart the hardware abnormal monitoring of the Machine Administration.
8. Preparation to recognize devices for Fibre Channel
If you use SAN management function, preparation to recognize devices.
9. Set up driver
    a. Add the driver configuration of PCI cards
    Add the driver configuration of PCI cards
    b. Add the configuration of device driver
    Add the configuration of device driver in the case of file devices.
10. Connect to redundant system
Connect device paths and interfaces of the replaced PCI card to the redundant system.
Switch the online path for extended path if needed.

Network devices procedures

1. Setup I/O devices which will be added to system
   Setup devices which will be added to system in the case of file devices on Solaris 8 OE.
2. Stop the hardware monitoring of the Machine Administration
   Stop the hardware abnormal monitoring of the Machine Administration.
3. Add PCI cards
   Extend PCI cards.
4. Connect PCI cards
   It changes into the state where the PCI card is usable.
5. Start the hardware monitoring of the Machine Administration
   Update the hardware configuration information, and restart the hardware abnormal monitoring of the Machine Administration.
6. Connect equipment to PCI cards
   Connect equipment to PCI cards.
7. Set up driver
   a. Add the driver configuration of PCI cards
      Add the driver configuration of PCI cards
   b. Add the configuration of device driver
      Add the configuration of device driver in the case of file devices.
8. Connect to redundant system
   Connect device paths and interfaces of the replaced PCI card to the redundant system.
9. Switch the redundant path
   Switch the online path for extended path if needed.

Chapter 3 File Devices

This chapter describes in detail the procedures of replacement and extension of file PCI cards by using PCI Hot Plug.

For details about software to use PCI cards in redundant configuration, see the manuals of each software.

3.1 Replacement of PCI card

This section describes the procedures to exchange PCI cards using the PCI Hot Plug feature on non-redundant and redundant systems.

3.1.1 Replacement of PCI cards on non-redundant system

Before exchanging PCI cards without using redundancy software such as multipath control, applications using the PCI cards must be stopped.

Follow the procedures below to exchange PCI cards on a non-redundant system.

1. Stop the machine administration hardware monitoring daemon
   Execute the following command to stop the hardware monitoring daemon of machine administration.

   ```
   # /usr/sbin/FJSVmadm/prephp <Return>
   ```

   If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following. The daemons will be stopped.

   ```
   # /etc/rc0.d/K10hbanyware stop <Return>
   # /etc/rc0.d/K10hbanywareDisc stop <Return>
   ```

2. Specify the replacing PCI card
   Follow the instructions below and determine the interface name of the path connecting the target PCI card and I/O devices and the connected I/O device.
   a. Determine from the WARNING messages output on the console the interface name of the path connecting the target PCI card and I/O devices and the connected I/O device.
      In the example below, **glm2** is the interface name of the path connecting the broken PCI card and I/O devices, and **sd20** is the disk device connected to glm2.
      When exchanging a PCI card which has two ports, the physical path name of the connection path between the I/O device corresponding to the other port, and the I/O device connected to that path must be determined in the same manner.
      The physical path name corresponding to the other port can be determined by the fact that the name of the two ports on the same PCI card have a relation like "/pci@89,4000/scsi@2" and "/pci@89,4000/scsi@2,1." The I/O device connected to that path resides under the directory of the physical path name determined.

      ```
      :
      WARNING: /pci@89,4000/scsi@2 (glm2):
      invalid intcode=fe00
      :
      WARNING: /pci@89,4000/scsi@2/sd@3,0 (sd20):
      SCSI transport failed: reason 'reset': giving up
      :
      ```

      If you use the Fibre Channel Card (PW028FC4/PW028FC5), the messages are shown as follows.

      ```
      :
      WARNING: lpfc0:INe:Adapter Hardware Error
      :
      WARNING: /pci@89,4000/fibre-channel@2/sd@3,0 (sd20):
      SCSI transport failed: reason 'reset': giving up
      ```

      Exec the following command and check the physical path name.

      ```
      # grep lpfc /etc/path_to_inst <Return>
      "/pci@89,4000/fibre-channel@2" 0 "lpfc"
      ```

      The second value is instance number of each lpfc instance.
   b. Determine the logical path name under /dev/dsk corresponding to the disk device (sd20) connected to the target PCI card. In the example below, "c2t3d0" is the logical path corresponding to sd20.

      ```
      # ls -l /dev/dsk | grep /pci@89,4000/scsi@2/sd@3,0 <Return>
      lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t3d0s0
      -> ../../devices/pci@89,4000/scsi@2/sd@3,0:a
      lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t3d0s1
      -> ../../devices/pci@89,4000/scsi@2/sd@3,0:b
      lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t3d0s2
      -> ../../devices/pci@89,4000/scsi@2/sd@3,0:c
      lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t3d0s3
      ```

```
-> ../../devices/pci@89,4000/scsi@2/sd@3,0:d
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t3d0s4
-> ../../devices/pci@89,4000/scsi@2/sd@3,0:e
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t3d0s5
-> ../../devices/pci@89,4000/scsi@2/sd@3,0:f
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t3d0s6
-> ../../devices/pci@89,4000/scsi@2/sd@3,0:g
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t3d0s7
-> ../../devices/pci@89,4000/scsi@2/sd@3,0:h
```

3. Stop applications
   Stop applications with the following operations.
   a. Stop vold.

```
# sh /etc/init.d/volmgt stop <Return>
```

   b. Stop the all I/O devices connected to the target PCI card (determined in procedure 3.).
   [If the device is a disk unit (file system operation)]
      1. Determine the mountpoint of the disk from the logical path name determined in procedure 3.b. (c2t3d0).

```
# mount | grep c2t3d0 <Return>
/export/home on /dev/dsk/c2t3d0s3 setuid/read/write/largefiles on Mon Sep 30
01:00:51 2002
/develop/firm on /dev/dsk/c2t3d0s0 setuid/read/write/largefiles on Mon Sep 30
01:00:51 2002
/develop/drv on /dev/dsk/c2t3d0s1 setuid/read/write/largefiles on Mon Sep 30
01:00:51 2002
/pub on /dev/dsk/c2t3d0s6 setuid/read/write/largefiles on Mon Sep 30 01:00:50
2002
```

      2. Stop access to the disk. To check which process is using the target file system, use the fuser(1M) command as follows.

```
# fuser -c /export/home <Return>
/export/home: 14967c 14571c 14493ctm 14020c 13828tm
13803c 13575c 13133c 13125tm 13107c 12682ctm 12066tm
12048c 11971ctm 11952ctm 11937c 11867c 11846c 349m
```

      3. Unmount the disk.

```
# umount /export/home <Return>
# umount /develop/firm <Return>
# umount /develop/drv <Return>
# umount /pub <Return>
```

   [If the device is a disk unit (raw access operation) or a tape device]
      1. Check the access statistics of the target disk determined in procedure 3.a. Do the same with a tape device.

```
# iostat -xc <Return>
extended device statistics cpu
device r/s w/s kr/s kw/s wait actv svc_t %w %b us sy wt id
sd0 59.7 7.5 474.5 45.0 0.0 3.9 58.6 0 41 3 7 23 67
sd1 0.1 0.3 1.0 2.5 0.0 0.0 16.0 0 0
sd20 0.0 0.1 0.3 0.7 0.0 0.0 14.7 0 0
st82 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0 0
nfs1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0 0
```

      2. Stop disk access of applications.
      Disk access statistics of the target disk can be checked as below.
      It is the same with tape devices. The example below shows access statistics of one minute.

```
# sar -d 60 1 <Return>

SunOS machine0 5.8 Generic_108528-05 sun4u 10/02/02

17:56:00 device %busy avque r+w/s blks/s avwait avserv
17:57:00 nfs1 0 0.0 0 0 0.0 0.0
sd0 2 0.3 2 37 0.0 145.5
sd0,a 1 0.1 0 5 0.0 301.4
sd0,b 0 0.0 0 9 0.0 31.5
sd0,c 0 0.0 0 0 0.0 0.0
sd0,d 1 0.0 0 4 0.0 126.8
sd0,e 0 0.0 0 0 0.0 0.0
sd0,f 1 0.1 1 6 0.0 120.9
sd0,g 1 0.1 1 14 0.0 111.7
```

```
:
sd20 0 0.0 0 0 0.0 0.0
sd20,a 0 0.0 0 0 0.0 0.0
sd20,c 0 0.0 0 0 0.0 0.0
sd20,g 0 0.0 0 0 0.0 0.0
:
st82 0 0.0 0 0 0.0 0.0
:
```

3. Stop (deactivate) applications. See the manuals of each software for details.

[If the device is a disk unit (swap device)]

1. Show a list of swap devices, and check that the disk of the logical path determined in procedure 3.b. (c2t3d0) is a swap device.

```
# swap -l <Return>
swapfile dev swaplo blocks free
/dev/dsk/c2t3d0s4 32,164 16 788384 683680
```

2. Delete the swap device.

```
# swap -d /dev/dsk/c2t3d0s4 <Return>
```

4. Disconnect the PCI card.
   Disconnect the target PCI card with the following procedure.
   a. By using inst2comp(1M) command, determine the slot position of the PCI card called an attachment point identifier ("Ap_Id") from the interface name of the path connecting the target PCI card and I/O devices determined in procedure 2.a. (glm2).
   Please refer to "PCI Hot Plug User's Guide" about the detail of inst2comp(1M) command. In this example, the "Ap_Id" is "**pcipsy3:C0M00-PCI#slot02**"

```
# /usr/sbin/FJSVmadm/inst2comp glm2 <Return>
pcipsy3:C0M00-PCI#slot02
```

   b. Specify "Ap_Id" determined from 4.a. as a parameter and confirm that the slot status of the PCI card to disconnect is "connected configured."

```
# cfgadm pcipsy3:C0M00-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy3:C0M00-PCI#slot02 mult/hp connected configured ok
```

   c. After executing the command to disconnect the PCI card specifying the "Ap_Id" from 4.a., confirm that the slot status has changed to "disconnected unconfigured."

```
# cfgadm -c disconnect pcipsy3:C0M00-PCI#slot02 <Return>
# cfgadm pcipsy3:C0M00-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy3:C0M00-PCI#slot02 unknown disconnected unconfigured unknown
```

   Note:
   When error occurs during disconnect, cfgadm command unusually fail with following message. If cfgadm command fails, execute the command once again.
   cfgadm: Component system is busy, try again: disconnect failed
   d. To confirm the slot position at replacement operation, blink the ALARM LED of Ap_Id displayed in procedure 4.a.

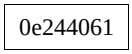
```
# cfgadm -x led=fault,mode=blink pcipsy3:C0M00-PCI#slot02 <Return>
```

5. Replace the PCI card
   Replace the PCI card disconnected in 4. with a replacement card and connect cable to devices. This operation is performed by our customer support.
   When exchanging Fibre Channel cards, the following operations are also required.

[for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:

- If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility
  No procedure is necessary. Go to step 7.
- If you don't use SAN management function of the above products
  To replace PCI cards with the following configurations, Fibre Channel switch SN200 series and disk array device ETERNUS3000/ETERNUS6000/GR700/800 series need to be reconfigured individually.
  - If zone configuration by WWPN(World Wide Port Name) is done on SN200 series.
  - If the Host Affinity function of ETERNUS3000/ETERNUS6000/GR700/800 series is used.
  For details, see "SN200 Series Affinity User's Guide" or "ETERNUSmgr User Guide/GRmgr User Guide." If you use the Fibre Channel switch or disk array device other than described above, see the document of each product.
  To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the eight characters shown on a label on the front plate of the card. These characters represent the bottom eight digit of the WWPN in hexadecimal form. The top eight digit are fixed to 10000000 in hexadecimal form.

For example, if the following label is shown on the front plate of the card, the WWPN of the replacement card is 100000000e244061.

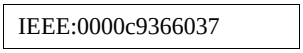


[for Fibre Channel Card (PW028FC4/PW028FC5)]:

To replace PCI cards with the following configurations,
Fibre Channel switch and disk array device need to be reconfigured individually.

- If zone configuration by WWPN (World Wide Port Name) is done on Fibre Channel switch.
- If the Host Zoning function of disk array device is used.

For details, see the document of each product.
To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the twelve characters shown on a label on the back of the card. These characters represent the bottom twelve digit of the WWPN in hexadecimal form. The top four digit are fixed to 1000 in hexadecimal form.
For example, if the following label is shown on the back of the card, the WWPN of the replacement card is 10000000c9366037.



Note:
When changing Affinity configuration on SN200 series or other Fibre Channel switch, I/O to other devices is effected by the change, and may result in temporal errors.
I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration
.

6. Connect the PCI card
   Connect the replaced PCI card using the cfgadm(1M) command with the configure option, or by pushing the button corresponding to the replacement slot position. Note that the push button is only effective in multiuser mode. After the new PCI card is connected, use the cfgadm(1M) command and confirm that the slot status has changed to "connected configured."
   If a large-scale configuration of I/O devices is connected to the PCI card in the target slot, command execution for status confirmation may take time.

```
# cfgadm -c configure pcipsy3:C0M00-PCI#slot02 <Return>
# cfgadm pcipsy3:C0M00-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy3:C0M00-PCI#slot02 mult/hp connected configured ok
```

   When exchanging Fibre Channel cards, the following operations are also required.

   [for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:

   - If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility
     a. Refresh current condition on management window.
        SAN (Storage Area Network) management function searches and indicates replaced PCI card. This function will adjust switch zoning and host affinity function of disk array device ETERNUS3000/ETERNUS6000/GR700/800 series with new WWN of replaced PCI card. See "Operation guide" or "User's Manual" of each product for details.
        Note:
        When changing Affinity configuration on SN200 series, I/O to other devices is effected by the change, and may result in temporal errors.
        I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.
     b. Reconnect the replaced PCI card with changed zoning setting by using the following commands.

```
# cfgadm -c disconnect pcipsy3:C0M00-PCI#slot02 <Return>
# cfgadm -c configure pcipsy3:C0M00-PCI#slot02 <Return>
# cfgadm pcipsy3:C0M00-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy3:C0M00-PCI#slot02 mult/hp connected configured ok
```

   - If you don't use SAN management function of the above products
     No procedure is necessary. Go to step 8.

   [for Fibre Channel Card (PW028FC4/PW028FC5)]:

   No procedure is necessary. Go to step 8.

7. Start applications.
   Restart the stopped applications with the following operations.
   a. Start vold

```
# sh /etc/init.d/volmgt start <Return>
```

   b. Restart the usage of the device stopped in procedure 4.b.

[If the device is a disk unit (file system operation)]
Mount the unmounted filesystem, and resume usage.

```
# mount -F ufs /dev/dsk/c2t3d0s3 /export/home <Return>
# mount -F ufs /dev/dsk/c2t3d0s0 /develop/firm <Return>
# mount -F ufs /dev/dsk/c2t3d0s1 /develop/drv <Return>
# mount -F ufs /dev/dsk/c2t3d0s6 /pub <Return>
```

[If the device is a disk unit (raw access operation) or a tape device]
Restart applications and resume usage.
Refer to the manual of each application for details.
[If the device is a disk unit (swap device)]
Add swap device, and resume usage.

```
# /sbin/swapadd -2 <Return>
```

8. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
   The daemons will be started.

```
# /etc/rc2.d/S99hbanyware start <Return>
# /etc/rc2.d/S99hbanywareDisc start <Return>
```

9. Update hardware configuration information of machine administration/ Start the hardware monitoring daemon.
   Execute the following commands to update hardware configuration information of machine administration and to restart the hardware monitoring daemon.

```
# /usr/sbin/FJSVmadm/postphp <Return>
```

3.1.2 Replacement of PCI cards on redundant system

PCI cards can be replaced without stopping services such as user applications on a redundant system using software such as multipath control.

Here, the procedure to replace PCI cards on a redundant system using the following redundancy software products is explained.

- Multipath Disk Control (MPHD)

- GR Multipath Driver (GRMPD)

If other redundancy software products are used, see the manual of each product.

1. Stop the machine administration hardware monitoring daemon
   Use the following command to stop the hardware monitoring daemon of machine administration.

```
# /usr/sbin/FJSVmadm/prephp <Return>
```

2. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
   The daemons will be stopped.

```
# /etc/rc0.d/K10hbanyware stop <Return>
# /etc/rc0.d/K10hbanywareDisc stop <Return>
```

3. Specify the replacing PCI card
   Follow the instructions below and determine the interface name of the path connecting the target PCI card and I/O devices and the connected I/O device. The following procedure is described for MPHD/GRMPHD. If you use the redundancy software other than MPHD/GRMPHD, see the document for each product.
   a. Determine from the WARNING messages output on the console the interface name of the path connecting the target PCI card and I/O devices and the connected I/O device.
      In the example below, fjpfca3 interface name of the path connecting the target PCI card and I/O devices, and hddv1is the LUN(Logical Unit Number) of the disk array device connected to fjpfca3.

```
:
WARNING: /pci@8d,2000/fibre-channel@1 (fjpfca3):
Hard Error : PCI DMA error.
:
WARNING: /pci@8d,2000/fibre-channel@1/hddv@1,0 (hddv1):
SCSI transport failed: reason 'reset': giving up
:
NOTICE: mphd0: I/O path switchover succeeded.
/pci@8d,2000/fibre-channel@1/hddv@1,0 => /pci@89,2000/fibre-
channel@1/hddv@2,0
:
```

      The following procedures are also explained assuming the console messages above.
   b. Find the hddv1 with the status "offline fail" from the results of the iompadm command, and determine the logical path name of the LUN connected to the target PCI card.
      The following is an example of MPHD, and "/dev/rdsk/c3t1d0s2" is the logical path name corresponding to hddv1.
      In case of GRMPD, specify "mplb" in the -c option parameter of the iompadm command. In case of updated

GRMPD from MPHD, specify the "mphd" as -c option parameter of the iompadm command.

```
# /usr/opt/FJSViomp/bin/iompadm -c mphd -p info <Return>
:
IOMP: /dev/FJSVmphd/fiomp/adm2
-> /devices/pseudo/mphd@2:adm
Element:
/dev/rdsk/c3t1d0s2 offline fail block "target completed hard
reset sequence [GR7104546- 010000-00-00-30] (hddv1)"
-> /devices/pci@8d,2000/fibre-channel@1/hddv@1,0:c,raw
/dev/rdsk/c2t2d0s2 online active block "good status with
active [GR7104546- 010000-01-01-32] (hddv15)"
-> /devices/pci@89,2000/fibre-channel@1/hddv@2,0:c,raw
Node:
/dev/FJSVmphd/rdsk/mphd2s0
/dev/FJSVmphd/rdsk/mphd2s1
/dev/FJSVmphd/rdsk/mphd2s2
/dev/FJSVmphd/rdsk/mphd2s3
/dev/FJSVmphd/rdsk/mphd2s4
/dev/FJSVmphd/rdsk/mphd2s5
/dev/FJSVmphd/rdsk/mphd2s6
/dev/FJSVmphd/rdsk/mphd2s7
Function:
MPmode=false
AutoPath=true
Block=true
NeedSync=false
:
```

c. Disconnect from redundant system
Disconnect the path between the target PCI card and I/O devices.
The following procedure is described for MPHD/GRMPHD. If you use the redundancy software other than MPHD/GRMPD, see the document for each product.
Execute the following command specifying the logical path name of the connected LUN determined in procedure 3.b. This command only needs to be executed on the representation LUN, and does not need to be executed on each LUN under the same PCI card.
If the operation path is disconnected on a redundant system, the standby path will automatically be switched to operation.
If both MPHD/GRMPD controlled devices are connected to the target PCI card, the commands for both products need to be executed.

```
MPHD
# /usr/opt/FJSViomp/bin/iompadm -c mphd change adapter_disconnect
/dev/rdsk/c3t1d0s2 <Return>
GRMPD
# /usr/opt/FJSViomp/bin/iompadm -c mplb change adapter_disconnect
/dev/rdsk/c3t1d0s2 <Return>
```

4. Disconnect the PCI card.
Disconnect the defected PCI card with the following procedures.
   a. Determine the slot position of the PCI card from the interface name of the path connecting the target PCI card and I/O devices determined in procedure 3.a. (fjpfca3). In this example, the "Ap_Id" is "pcipsy21:R0B01-PCI#slot03".

```
# /usr/sbin/FJSVmadm/inst2comp fjpfca3 <Return>
pcipsy21:R0B01-PCI#slot03
```

   b. Specify the "Ap_Id" from 4.a. as a parameter and confirm that the slot status of the PCI card to disconnect is "connected configured".

```
# cfgadm pcipsy21:R0B01-PCI#slot03 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy21:R0B01-PCI#slot03 fibre/hp connected configured ok
```

   c. After executing the command to disconnect the PCI card specifying the "Ap_Id" from 4.b., confirm that the slot status has changed to "disconnected unconfigured."

```
# cfgadm -c disconnect pcipsy21:R0B01-PCI#slot03 <Return>
# cfgadm pcipsy21:R0B01-PCI#slot03 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy21: R0B01-PCI#slot03 unknown disconnected unconfigured unknown
```

Note:
When error occurs during disconnect, cfgadm command unusually fail with following message. If cfgadm

command fails, execute the command once again.
cfgadm: Component system is busy, try again: disconnect failed

d. To confirm the slot position at replacement operation, blink the ALARM LED of Ap_Id displayed in procedure 4.a.

```
# cfgadm -x led=fault,mode=blink pcipsy21:R0B01-PCI#slot03 <Return>
```

5. Replace the PCI card

Replace the PCI card disconnected in 4. with a replacement card and connect cable to devices. This operation is performed by our customer support.

When exchanging Fibre Channel cards, the following operations are also required.

[for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:

If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility

No procedure is necessary. Go to step 7.

If you don't use SAN management function of the above products

To replace PCI cards with the following configurations, Fibre Channel switch SN200 series and disk array device ETERNUS3000/ETERNUS6000/GR700/800 series need to be reconfigured individually.

- If zone configuration by WWPN(World Wide Port Name) is done on SN200 series.
- If the Host Affinity function of ETERNUS3000/ETERNUS6000/GR700/800 series is used.

For details, see "SN200 Series Affinity User's Guide" or "ETERNUSmgr User Guide/GRmgr User Guide." If you use the Fibre Channel switch or disk array device other than described above, see the document of each product.

To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the eight characters shown on a label on the front plate of the card. These characters represent the bottom eight digit of the WWPN in hexadecimal form. The top eight digit are fixed to 10000000 in hexadecimal form.

For example, if the following label is shown on the front plate of the card, the WWPN of the replacement card is 100000000e244061.

```
0e24
4061
```

[for Fibre Channel Card (PW028FC4/PW028FC5)]:

To replace PCI cards with the following configurations, Fibre Channel switch and disk array device need to be reconfigured individually.

- If zone configuration by WWPN (World Wide Port Name) is done on Fibre Channel switch.
- If the Host Zoning function of disk array device is used.

For details, see the document of each product.

To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the twelve characters shown on a label on the back of the card. These characters represent the bottom twelve digit of the WWPN in hexadecimal form. The top four digit are fixed to 1000 in hexadecimal form.

For example, if the following label is shown on the back of the card, the WWPN of the replacement card is 10000000c9366037.

```
IEEE:0000c9366037
```

Note:

When changing Affinity configuration on SN200 series or other Fibre Channel switch, I/O to other devices is effected by the change, and may result in temporal errors.

I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.

6. Connect the PCI card

Connect the replaced PCI card using the cfgadm(1M) command with the configure option, or by pushing the button corresponding to the replacement slot position. Note that the push button is only effective in multiuser mode. After the new PCI card is connected, use the cfgadm(1M) command and confirm that the slot status has changed to "connected configured."

If a large-scale configuration of I/O devices is connected to the PCI card in the target slot, command execution for status confirmation may take time.

```
# cfgadm -c configure pcipsy3:C0M00-PCI#slot02 <Return>
# cfgadm pcipsy3:C0M00-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy3:C0M00-PCI#slot02 mult/hp connected configured ok
```

When exchanging Fibre Channel cards, the following operations are also required.

[for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:

- **If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility**

  a. Refresh current condition on management window.
  SAN (Storage Area Network) management function searches and indicates replaced PCI card.
  This function will adjust switch zoning and host affinity function of disk array device ETERNUS3000/ETERNUS6000/GR700/800 series with new WWN of replaced PCI card.

See "Operation guide" or "User's Manual" of each product for details.

Note:
When changing Affinity configuration on SN200 series, I/O to other devices is effected by the change, and may result in temporal errors.
I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.

b. Reconnect the replaced PCI card with changed zoning setting by using the following commands.

```
# cfgadm -c disconnect pcipsy3:C0M00-PCI#slot02 <Return>
# cfgadm -c configure pcipsy3:C0M00-PCI#slot02 <Return>
# cfgadm pcipsy3:C0M00-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy3:C0M00-PCI#slot02 mult/hp connected configured ok
```

- If you don't use SAN management function of the above products
No procedure is necessary. Go to step 7.
[for Fibre Channel Card (PW028FC4/PW028FC5)]:
No procedure is necessary. Go to step 7.

7. Connect to redundant system
   The following procedure is described for MPHD/GRMPHD. If you use the redundancy software other than MPHD/GRMPHD, see the document for each product.
   Execute the following command specifying the logical path name from 3.b. If the operating path switched in procedure 3., the operating path will be automatically switched back.
   If both MPHD/GRMPD controlled devices are connected to the PCI card to replace, the commands for both products need to be executed.

```
MPHD
# /usr/opt/FJSViomp/bin/iompadm -c mphd restart adapter_connect /dev/rdsk/c3t1d0s2
<Return>

GRMPD
# /usr/opt/FJSViomp/bin/iompadm -c mplb restart adapter_connect /dev/rdsk/c3t1d0s2
<Return>
```

8. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
   The daemons will be started.

```
# /etc/rc2.d/S99hbanyware start <Return>
# /etc/rc2.d/S99hbanywareDisc start <Return>
```

9. Update hardware configuration information of machine administration/ Start the hardware monitoring daemon.
   Execute the following commands to update hardware configuration information of machine administration and to restart the hardware monitoring daemon.

```
# /usr/sbin/FJSVmadm/postphp <Return>
```

3.2 Extension of PCI cards

This section describes the procedures to add PCI cards using the PCI Hot Plug feature on non-redundant and redundant systems with Solaris 8 OE and Solaris 9 OE or later. The difference between the procedures for the two OEs is that I/O devices to be added must be pre-defined before system operation with Solaris 8 OE, but pre-definition is not needed with Solaris 9 OE or later.

3.2.1 Solaris 8 OE

The procedures to add PCI cards on a Solaris 8 OE system are explained here. To use the PCI Hot Plug function for extension on Solaris OE, I/O devices to be added must be pre-defined and the system must be rebooted before system operation. If the I/O devices to be added are already defined, pre-definition is not needed, and procedure 1. below can be skipped.

If you use Fibre Channel Card (PW028FC4/PW028FC5), ensure the automap function is effective. Boot the system after modifying lpfc.conf.

```
# vi /kernel/drv/lpfc.conf <Return>
:
# If automap is set, SCSI IDs for all FCP nodes without
# persistent bindings will be automatically generated.
# If new FCP devices are added to the network when the system is down,
# there is no guarantee that these SCSI IDs will remain the same
# when the system is booted again.
# The bind method of the port is used as the binding method of
# automap devices to preserve SCSI IDs between link down and link up.
# If automap is 0, only devices with persistent bindings will be
# recognized by the system.
```

```
automap=1; <-- set to 1
:
```

3.2.1.1 Extension of PCI cards on non-redundant system

Procedures to add PCI cards without making them redundant on a Solaris 8 OE system are explained here.

1. Setup I/O devices which will be added to system
   Pre-define devices to be added with the following procedures according to the device type. Extension using PCI Hot Plug cannot be done without definition, so devices must be defined before the system goes into operation.
   [Disk/Tape devices(Solaris OE: sd/st)]
   This is an example where a disk device at target=2, lun=0 is pre-defined. If the device is a tape device, re-read "sd" in the following as "st" and perform the same operations.
   a. Confirm that target=2, lun=0 is defined in /kernel/drv/sd.conf.
      If this definition does not exist, add the definition. If it is commented out, remove the comments.

```
Disk device
# vi /kernel/drv/sd.conf <Return>
:
name="sd" class="scsi"
target=0 lun=0;
:
name="sd" class="scsi" In case the definition does not exist,
target=2 lun=0; add or remove comments.
:
Tape device
# vi /kernel/drv/st.conf <Return>
:
name="st" class="scsi"
target=0 lun=0;
:
name="st" class="scsi" In case the definition does not exist,
target=5 lun=0; add or remove comments.
:
```

   b. In case /kernel/drv/sd.conf was updated in 1.a., reconfigure the kernel , restart the system, and then start system operation.
      If it was not updated, this procedure is not required.

```
# touch /reconfigure <Return>
# shutdown -y -i6 -g0 <Return>
```

   [Disk Array device(hard disk driver:hddv)]
   This is an example where a disk array device at target=3, lun=0-2 is pre-defined.
   If this is the first time to pre-define a disk array device, start from procedure 1.a. If this is not the first time to pre-define a disk array device, start from procedure 1.e.
   a. Check if /kernel/drv/hddv.conf exists
      If it does not exist, the hard disk driver is being installed, so start from procedure 1.c. If it does exist, the system is being operated with non-active extension procedures, so start from procedure 1.b.

```
Not exist(new install) [ to procedure 1.c.]
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf: No such file or directory
Exists(operation with non-active extension procedures) [ to procedure 1.b.]
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf
```

   b. When operating with non-active extension procedures, execute the following commands and confirm that /kernel/drv/hddv.conf is deleted.

```
# hddvadm -i <Return>
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf: No such file or directory
```

   c. Use the following command to create an hddv.conf file for the pre-defined extension function.
      The message examples for "operation with non-active extension procedures" means that GR720 currently used with taget=1(lun=0) is registered twice on the sd/hddv driver.

```
New installation [ to procedure 1.e.]
# hddvadm -M <Return>
Operation with non-active extension procedures [ to procedure 1.d.]
# hddvadm -M <Return>
already ID= 1 exists. /devices/pci@1d,2000/fibre-channel@1/sd@1,0:a,raw : GR720
```

d. When performing pre-defined extension, the same target number cannot be registered in sd.conf and hddv.conf, so delete or comment out the conflicting definition parts in sd.conf file when definition in the two files conflict with each other.
The following example shows the case that target=1 is repeated.

```
# vi /kernel/drv/sd.conf <Return>
:
name="sd" class="scsi"
target=0 lun=0;
:
#name="sd" class="scsi"
target=1 lun=0;
#name="sd" class="scsi" Delete or comment out
target=1 lun=1; conflicting definition parts in sd/hddv.
#name="sd" class="scsi"
target=1 lun=2;
:
```

A target number that is already used by the sd driver of the system disk or CD-ROM cannot be deleted. In this case, change the target number in hddv.conf and of the disk array device so that it does not conflict with sd.conf.

e. Edit the /kernel/drv/hddv.conf file created automatically by the hddvadm -M command, and remove comments of the LUN definition to pre-define and the LUN definition currently being used with non-active extension procedures.
If case active extension has been performed before and the LUN definition to extend the next procedures 1.f. - 1.g. are not needed.
The following example shows target=3, lun=0~2 for pre-defined extension and disk array device GR720 (target=1) in use with non-active extension procedures being registered.

```
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf
# vi /kernel/drv/hddv.conf <Return>
:
#name="hddv" class="scsi" target=0 lun=0;
:
#name="hddv" class="scsi" target=0 lun=7;
:
name="hddv" class="scsi" target=1 lun=0;
name="hddv" class="scsi" target=1 lun=1; Remove comments of the LUN in use
name="hddv" class="scsi" target=1 lun=2;
:name="hddv" class="scsi" target=3 lun=0;
name="hddv" class="scsi" target=3 lun=1; Remove comments of extended LUN
name="hddv" class="scsi" target=3 lun=2;
#name="hddv" class="scsi" target=3 lun=3;
:
```

f. Check for LUN definition conflict between sd.conf and hddv.conf by executing the hddvchk_conf command.
The message example for "Check NG" means that target=3 is defined in both files,
and the procedures must be performed again from procedure 1.d.
The followings are examples of execution of the FJSVhddv package installation to /opt. The path of the hddvchk_conf command depends on the installed directory.

```
Check OK [ to procedure 1.g.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
/kernel/drv/sd.conf and /kernel/drv/hddv.conf seems to be correct

Check NG [ to procedure 1.d.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
NG ID = [ 3 ]
```

g. Reconfigure the kernel, restart the system, and then start system operation.

```
# touch /reconfigure <Return>
# /usr/sbin/shutdown -y -i6 -g0 <Return>
```

2. Stop the machine administration hardware monitoring daemon
Execute the following commands to stop the machine administration hardware monitoring daemon.

```
# /usr/sbin/FJSVmadm/prephp <Return>
```

3. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
The daemons will be stopped.

```
# /etc/rc0.d/K10hbanyware stop <Return>
# /etc/rc0.d/K10hbanywareDisc stop <Return>
```

4. Add PCI cards

Add PCI cards according to the following procedure.

[for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:

If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility

No procedure is necessary. Go to step 5.

If you don't use SAN management function of the above products

To add PCI cards with the following configurations, Fibre Channel switch SN200 series and disk array device ETERNUS3000/ETERNUS6000/GR700/800 series need to be reconfigured individually.

- If zone configuration by WWPN(World Wide Port Name) is done on SN200 series.
- If the Host Affinity function of ETERNUS3000/ETERNUS6000/GR700/800 series is used.

For details, see "SN200 Series Affinity User's Guide" or "ETERNUSmgr User Guide/GRmgr User Guide." If you use the Fibre Channel switch or disk array device other than described above, see the document of each product.

To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the eight characters shown on a label on the front plate of the card. These characters represent the bottom eight digit of the WWPN in hexadecimal form. The top eight digit are fixed to 10000000 in hexadecimal form.

For example, if the following label is shown on the front plate of the card, the WWPN of the replacement card is 100000000e244061.

```
0e24
4061
```

[for Fibre Channel Card (PW028FC4/PW028FC5)]:

To replace PCI cards with the following configurations, Fibre Channel switch and disk array device need to be reconfigured individually.

- If zone configuration by WWPN (World Wide Port Name) is done on Fibre Channel switch.
- If the Host Zoning function of disk array device is used.

For details, see the document of each product.

To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the twelve characters shown on a label on the back of the card. These characters represent the bottom twelve digit of the WWPN in hexadecimal form. The top four digit are fixed to 1000 in hexadecimal form.

For example, if the following label is shown on the back of the card, the WWPN of the replacement card is 10000000c9366037.

```
IEEE:0000c9366037
```

Note:

When changing Affinity configuration on SN200 series or other Fibre Channel switch, I/O to other devices is effected by the change, and may result in temporal errors.

I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.

a. Before extension of PCI cards, save the current execution result of the prtpicl(1M) command (current configuration at present.)

```
# prtpicl -v > /tmp/prtpicl.pre <Return>
```

b. Check the status of the slot.

The relationship of the position of a PCI card and format of "Ap_Id" is shown below.

Location of PCI slot	Element	Format of "Ap_Id"
Cabinet of PRIMEPOWER 900/1500/2500	Cabinet Number : **X** System Board Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:C**X**M0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** C**X**M0**Y**-PCI#**ZZ**
PCI / Disk Box	I/O Cabinet Number : **X** PCI / Disk Box Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:R**X**B0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** R**X**B0**Y**-PCI#**ZZ**
other than those above	Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:PCI#slot**ZZ** ·**Solaris 10 OE** PCI#**ZZ**

Below, an example of adding a PCI card to chassis number : 0, system board number : 1, physical slot number : 02,slot in chassis(C0M01-PCI#slot02) is explained.

Check the status of the target slot is "empty unconfigured."

```
# cfgadm | grep C0M01-PCI#slot02 <Return>
pcipsy15:C0M01-PCI#slot02 unknown empty unconfigured unknown
```

c. To confirm the slot position at extension operation, blink the ALARM LED of Ap_Id displayed in procedure 4.b.

```
# cfgadm -x led=fault,mode=blink pcipsy15:C0M01-PCI#slot02 <Return>
```

d. After checking that the READY LED on the PCI slot to add the PCI card is off, add PCI cards and connect cable to devices. This operation is performed by our customer support.

e. Use the cfgadm(1M) command to check that the slot status of the added PCI card changed to "disconnected unconfigured".

```
# cfgadm pcipsy15:C0M01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy15:C0M01-PCI#slot02 unknown disconnected unconfigured unknown
```

5. Connect PCI cards

Connect the replaced PCI card using the cfgadm(1M) command with the configure option, or by pushing the button corresponding to the extension slot position. Note that the push button is only effective in multiuser mode. After the new PCI card is connected, use the cfgadm(1M) command and confirm that the slot status has changed to "connected configured."

If a large-scale configuration of I/O devices is connected to the PCI card in the target slot, command execution for status confirmation may take time.

```
# cfgadm -c configure pcipsy15:C0M01-PCI#slot02 <Return>
# cfgadm pcipsy15:C0M01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy15:C0M01-PCI#slot02 mult/hp connected configured ok
```

6. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.

The daemons will be started.

```
# /etc/rc2.d/S99hbanyware start <Return>
# /etc/rc2.d/S99hbanywareDisc start <Return>
```

7. Update hardware configuration information of machine administration/ Start the hardware monitoring daemon.

Execute the following commands to update hardware configuration information of machine administration and to restart the hardware monitoring daemon.

```
# /usr/sbin/FJSVmadm/postphp <Return>
```

8. Preparation to recognize devices for Fibre Channel

When the Host Affinity function is being used with Fibre Channel SN200 series, Host Affinity must be configured for the device added.

[for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:

If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility

WWPN zoning of SN200 series, Host affinity of Array disk device ETERNUS3000/ETERNUS6000/GR700/800 series and binding setting for fjpfca.conf/sd.conf of host can be added from SAN management window automatically.

See "Operation guide" or "User's Manual" of each product for details.

Before using this function, the following procedure 9.a.1. and 9.a.2. [except fcp-bind-target setting] are necessary.

Moreover, begin from procedure 9.a.3. after executing this function.

If you don't use SAN management function of the above products

No procedure is necessary. Go to step 9.

[for Fibre Channel Card (PW028FC4/PW028FC5)]:

No procedure is necessary. Go to step 9.

Note:

When changing Affinity configuration on SN200 series, I/O to other devices is effected by the change, and may result in temporal errors.

I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.

9. Set up driver

Add the configuration of driver according to the following operation.

As for file related drivers, additional configuration of the PCI card driver and the device driver is needed.

a. Add configurations of PCI card driver

[SCSI driver(Solaris OE: glm , FUJITSU PCI SCSI Adapter Driver)]

Configuration is not required.

[Fibre Channel driver (PW008FC2U/ W008FC2X/GP7B8FC1U/GP7B8FC1X)]

1. After saving execution result of prtpicl (1M) command, take the difference between the result and the information obtained in procedure 4.a. to calculate the instance number of the fjpfca driver of the PCI card added.

   In the following example, instance number is 1, indicating that the interface name of the PCI card added is fjpfca1.

   Making the LED of the PCI card blink using the fc_adm command can specify the relation between the instance number and the slot position. The relation between the WWPN and instance number of the PCI card added can be known from the "fc_info -a" command.

```
# prtpicl -v > /tmp/prtpicl.pfca <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.pfca | more <Return>
:
> :status okay
> :devfs-path /pci@8d,2000/fibre-channel@1
> :driver-name fjpfca
> :binding-name pci10cf,105c
> :bus-addr 1
> :instance 1
> :_class obp-device
> :name fibre-channel
:
# /usr/sbin/FJSVpfca/fc_adm -l fjpfca1 <Return>
```

2. Edit /kernel/drv/fjpfca.conf and add the following property definitions to the instance number from 9.a.1.
   port (topology classification , link speed)
   Define this property when PCI cards using Fabric connection are added.
   This definition is not needed with FC-AL connection.
   fcp-bind-target(connection of target ID and WWN)
   Define this property when disk array equipment using Fabric connections are added.
   This definition is not needed with FC-AL connection.
   max-throttle(number of maximum SCSI command issue)
   This property is defined for restriction on simultaneous issue of SCSI commands.
   The necessity and value of this definition depends on the specification of the disk array device, so refer to the user's manual of each equipment.
   The following example shows the definition of a fjpfca1 PCI card (instance number : 1) and disk array equipment(target = 3) being added.

```
# vi /kernel/drv/fjpfca.conf <Return>
:
port=
fjpfca0:nport",
"fjpfca1:nport:sp1"; <- added

fcp-bind-target=
"fjpfca0t0:0x50000e1000002501",
"fjpfca1t3:0x50000e1000002ab0"; <- added

max-throttle=
"fjpfca0t0:128",
"fjpfca1t3:240"; <- added
:
```

3. Execute the following command to make the fjpfca driver take in the added part.

```
# /usr/sbin/FJSVpfca/fc_config -v <Return>
```

[Fibre Channel driver (PW028FC4/PW028FC5)]
Configuration is not required.
Compare the output of prtpicl(1M) command with the output saved at 4.b and find the instance number of the added card.

b. Add device driver configuration
   Add device driver configuration with the following procedures according to the I/O device type.
   [Disk/Tape devices(Solaris OE : sd/st)]
   This example is a case where a disk device of target=2, lun=0 is pre-defined in procedure 1. and added in procedure 6. If the device is a tape device, re-read "sd" as "st" in this procedure and perform the same operation.
   1. Execute the following command to make the sd driver set up the added disk device.

```
# /usr/sbin/devfsadm <Return>
```

   2. After saving the execution result of the prtpicl(1M) command, take the difference between the result and the information obtained in 4.a. and get the physical path name of additional disk device, then get the logical path name under /dev/dsk.
      In the following example, "c2t2d0" is the logical path name of the disk device added.

```
# prtpicl -v > /tmp/prtpicl.post <Return>
Disk device
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep sd <Return>
> :devfs-path /pci@89,4000/scsi@2/sd@2,0
# ls -l /dev/dsk | grep /pci@89,4000/scsi@2/sd@2,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s0
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:a
```

```
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s1
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s2
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s3
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:d
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s4
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:e
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s5
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:f
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s6
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:g
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s7
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:h

Tape device
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep st <Return>
> :devfs-path /pci@89,4000/scsi@2/st@5,0
# ls -l /dev/rmt | grep /pci@89,4000/scsi@2/st@5,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1
-> ../../devices/pci@89,4000/scsi@2/st@5,0:
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1b
-> ../../devices/pci@89,4000/scsi@2/st@5,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1bn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:bn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1c
-> ../../devices/pci@89,4000/scsi@2/st@5,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1cb
-> ../../devices/pci@89,4000/scsi@2/st@5,0:cb
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1cbn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:cbn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1cn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:cn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1h
-> ../../devices/pci@89,4000/scsi@2/st@5,0:h
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1hb
-> ../../devices/pci@89,4000/scsi@2/st@5,0:hb
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1hbn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:hbn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1hn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:hn
```

3. If the device is a disk device, start the format(1M) command and configure labeling and partition(slice) information of the logical path name of added disks.
   If the device is a tape device, this procedure is not needed.

[Disk array device (hard disk driver : hddv)]

This example is a case where a disk array device of target=3, lun=0-2 is pre-defined in procedure 1. and added in procedure 5.

1. There may be a change of status depending on the system operating state after pre-definition in procedure 1., so check the LUN definition conflict between sd.conf and hddv.conf again. In case of "Check NG", the definitions are conflicting, so go back to procedure 1.e.

```
Check OK [ to procedure 9.b.2.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
/kernel/drv/sd.conf and /kernel/drv/hddv.conf seems to be correct

Check NG [ to procedure 1.e.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
NG ID = [ 3 ]
```

2. Execute the following command to make the hard disk driver set up the LUN.

```
# /usr/sbin/hddvadmdr <Return>
```

3. After saving execution result of the prtpicl command, get the physical path name of added LUN by taking the difference between the result and the information obtained in 4.a, and calculate the corresponding logical path name under /dev/dsk
   In the following example, "c3t3d0" is logical path name of added lun=0. The logical path name of lun=1,2 is set to "c3t3d1", "c3t3d2" respectively, because cXtYdZmeans X: PCI card number, Y: target number, Z: lun number .

```
# prtpicl -v > /tmp/prtpicl.post <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep hddv
<Return>
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,0
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,1
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,2
# ls -l /dev/dsk | grep /pci@89,2000/fibre-channel@1/hddv@3,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s0
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:a
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s1
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s2
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s3
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:d
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s4
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:e
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s5
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:f
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s6
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:g
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s7
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:h
```

4. Start the format(1M) command and configure labeling and partition(slice) information calculated in 9.b.3. to the logical path name of each extended LUN.

c. Add configure of PCI card driver

[SCSI driver(Solaris OE: glm , FUJITSU PCI SCSI Adapter Driver)]

No procedure is necessary. Go to step 10.

[Fibre Channel driver (PW008FC2U/ W008FC2X/GP7B8FC1U/GP7B8FC1X)]

No procedure is necessary. Go to step 10.

[Fibre Channel Card (PW028FC4/PW028FC5)]

Bind the auto mapped target connected with the card and modify the entries of lpfc.conf to match the requirements of the extended Fibre Channel Controller. These procedures are reflected on next boot time. In the following, indicate to bind the auto mapped target with the card.

```
# /usr/sbin/lpfc/lputil <Return>
LightPulse Common Utility for Solaris/SPARC. Version 1.6a8 (03/03/2004).
Copyright (c) 2003, Emulex Network Systems, Inc.

Emulex Fibre Channel Host Adapters Detected: 2
Host Adapter 0 (lpfc11) is an LP9802 (Ready Mode)
Host Adapter 1 (lpfc9) is an LP9802 (Ready Mode)

MAIN MENU
1. List Adapters
2. Adapter Information
3. Firmware Maintenance
4. Reset Adapter
5. Persistent Bindings
0. Exit
Enter choice => 5 <Return>

PERSISTENT BINDINGS MENU
1. Display Current Bindings
2. Display All Nodes
3. Duplicate Adapter Bindings
4. Bind Target Manually
5. Bind Automapped Targets
6. Delete Binding(s)
0. Return to Main Menu
Enter choice => 5 <Return>
0. lpfc11
1. lpfc9
Select an adapter => 0 <Return>

Automapped FCP Nodes:
Node Target WWPN WWNN
```

```
---- ------ --------- --------
Automapped FCP Node 0 50-06-0e-80-00-10-04-92 50-06-0e-80-00-10-04-92
Automapped FCP Node 1 50-06-0e-80-00-10-04-90 50-06-0e-80-00-10-04-90

Press the Enter or Return key to continue:
Bind all auto-mapped targets? (Y/N) => Y <Return>

Select Binding Method:
1. By Node Name
2. By Port Name
3. By D_ID
0. Cancel
Enter Choice => 2 <Return>
:
```

10. Setup applications
    Add configuration for the application using the logical path name determined in 9.b.
    [Disk device(filesystem operation)]
    Create file system.
    To mount at system start, add an entry in the /etc/vfstab file.

```
# newfs /dev/rdsk/c2t2d0s6 <Return>
# vi /etc/vfstab <Return>
:
/dev/dsk/c2t2d0s6 /dev/rdsk/c2t2d0s6 /mnt ufs 1 yes -
:
```

    [Disk device(raw access operation)/Tape device]
    Configure applications.
    For details, see the manual of each application.
    [Disk device(swap device)]
    Add swap device.
    To make valid at system start, add an entry in the /etc/vfstab file.

```
# swap -a /dev/dsk/c2t2d0s4 <Return>
# vi /etc/vfstab <Return>
:
/dev/dsk/c2t2d0s4 - - swap - no -
:
# swap -l <Return>
swapfile dev swaplo blocks free
:
/dev/dsk/c2t2d0s4 32,164 16 788384 683680
```

11. Start applications
    Use the logical path name determined in 9.b. to start applications.
    [Disk device(filesystem operation)]
    Mount filesystem

```
# mount -F ufs /dev/dsk/c2t2d0s6 /mnt <Return>
```

    [Disk device(raw access operation)/Tape device]
    Start applications.
    For details, see the manual of each application.
    [Disk device(swap device)]
    This procedure is not required.

3.2.1.2 Extension of PCI cards on new redundant system

The procedure to add PCI cards to a new redundant system on a Solaris 8 OE system is explained with examples for the multipath software below.

-Multipath Disk Control (MPHD)

- GR Multipath Driver (GRMPD)

If other multipath software is being used, see the manual of each product.

1. Setup devices which will be added to system
   This is an example where an disk array device at target=3, lun=0-2 is pre-defined.
   Extension using PCI Hot Plug is impossible without definition, so definition must be done before the system goes into operation.
   [If you use Solaris OE:sd]
   If this is the first time to pre-define a disk array device, begin with procedure 1.a. If this is not the first time to pre-define

a disk array device, go to step 2.

a. Modify /kernel/drv/sd.conf
   Ensure target=3,lun=0 target=3,lun=1 target=3,lun=3 are defined in /kernel/drv/sd.conf.
   If they are not defined or commented, modify /kernel/drv/sd.conf.

```
# vi /kernel/drv/sd.conf <Return>
:
name="sd" class="scsi"
target=0 lun=0;
:
name="sd" class="scsi"
target=3 lun=0;
name="sd" class="scsi"
target=3 lun=1;
name="sd" class="scsi"
target=3 lun=2;:
```

b. Boot the system and reconfigure the kernel.

```
# touch /reconfigure <Return>
# /usr/sbin/shutdown -y -i6 -g0 <Return>
```

[If you use hddv]

If this is the first time to pre-define a disk array device, begin with procedure 1.a. If this is not the first time to pre-define a disk array device, begin with procedure 1.e.

a. Check if /kernel/drv/hddv.conf exists
   Check if /kernel/drv/hddv.conf exists. If it exists, the hard disk driver is being installed, so start from procedure 1.c. If it does not exist, the system is being operated with none-active extension procedures, so start from procedure 1.b.

```
Not exist(new install) [ to procedure 1.c.]
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf: No such file or directory

Exists(operation with non-active extension procedures) [ to procedure 1.b.]
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf
```

b. When operating with non-active extension procedures, execute the following commands and confirm that /kernel/drv/hddv.conf is deleted.

```
# hddvadm -i <Return>
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf: No such file or directory
```

c. Use the following command to create hddv.conf file for the pre-defined extension function. The message examples for "operation with non-active extension procedures" means that disk array device GR720 currently used with taget=1(lun=0) is registered twice on the sd/hddv driver.

```
New installation [ to procedure 1.e.]
# hddvadm -M <Return>

Operation with non-active extension procedures [ to procedure 1.d.]
# hddvadm -M <Return>
already ID= 1 exists. /devices/pci@1d,2000/fibre-channel@1/sd@1,0:a,raw : GR720
```

d. When performing pre-defined extension, the same target number cannot be registered in sd.conf and hddv.conf, so delete or comment out the conflicting definition parts in sd.conf file when definition in the two files conflict with each other.
   The following example shows the case that target=1 is repeated.

```
# vi /kernel/drv/sd.conf <Return>
:
name="sd" class="scsi"
target=0 lun=0;
:
#name="sd" class="scsi"
target=1 lun=0;
#name="sd" class="scsi" Delete or comment out
target=1 lun=1; conflicting definition parts in sd/hddv
#name="sd" class="scsi"
target=1 lun=2;
:
```

   A target number that is already used by the sd driver of the system disk or CD-ROM cannot be deleted. In this

case, change the target number in hddv.conf and of the disk array device so that it does not conflict with sd.conf.

e. Edit the /kernel/drv/hddv.conf file created automatically by the hddvadm -M command, and remove comments of the LUN definition to pre-define and the LUN definition currently being used with non-active extension procedures.
If case active extension has been performed before and the LUN definition to extend the next procedures 1.f. - 1.g. are not needed.
If the target number of each disk array controller of a redundant system differs, add definition for each target number.
The following example shows target=3 , lun=0~2 for pre-defined extension and disk array device GR720 (target=1) in use with non-active extension procedures being registered.

```
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf
# vi /kernel/drv/hddv.conf <Return>
:
#name="hddv" class="scsi" target=0 lun=0;
:
#name="hddv" class="scsi" target=0 lun=7;
:
name="hddv" class="scsi" target=1 lun=0;
name="hddv" class="scsi" target=1 lun=1; Remove comments of the LUN in use
name="hddv" class="scsi" target=1 lun=2;
:
name="hddv" class="scsi" target=3 lun=0;
name="hddv" class="scsi" target=3 lun=1; Remove comments of extended LUN
name="hddv" class="scsi" target=3 lun=2;
#name="hddv" class="scsi" target=3 lun=3;
:
```

f. Check the LUN definition overlap between sd.conf and hddv.conf by executing hddvchk_conf command.
The message example for "Check NG" means that target=3 is defined in both files,
and the procedures must be performed again from procedure 1.d.
The followings are examples of execution of the FJSVhddv package installation to /opt. The path of the hddvchk_conf command depends on the installed directory.

```
Check OK [ to procedure 1.g.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
/kernel/drv/sd.conf and /kernel/drv/hddv.conf seems to be correct

Check NG [ to procedure 1.d.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
NG ID = [ 3 ]
```

g. Reconfigure the kernel , restart the system, and then start system operation.

```
# touch /reconfigure <Return>
# /usr/sbin/shutdown -y -i6 -g0 <Return>
```

2. Stop the machine administration monitoring daemon
Use the following command to stop the hardware disorder monitoring daemon of machine administration.

```
# /usr/sbin/FJSVmadm/prephp <Return>
```

3. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
The daemons will be stopped.

```
# /etc/rc0.d/K10hbanyware stop <Return>
# /etc/rc0.d/K10hbanywareDisc stop <Return>
```

4. Add PCI cards
Add PCI cards according to the following procedure.
[for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:
If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility
No procedure is necessary. Go to step 5.
If you don't use SAN management function of the above products
To add PCI cards with the following configurations, Fibre Channel switch SN200 series and disk array device ETERNUS3000/ETERNUS6000/GR700/800 series need to be reconfigured individually.
-If zone configuration by WWPN(World Wide Port Name) is done on SN200 series.
-If the Host Affinity function of ETERNUS3000/ETERNUS6000/GR700/800 series is used.
For details, see "SN200 Series Affinity User's Guide" or "ETERNUSmgr User Guide/GRmgr User Guide." If you use the Fibre Channel switch or disk array device other than described above, see the document of each product.
To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the eight characters shown on a label on the front plate of the card. These characters

represent the bottom eight digit of the WWPN in hexadecimal form. The top eight digit are fixed to 10000000 in hexadecimal form.
For example, if the following label is shown on the front plate of the card, the WWPN of the replacement card is 100000000e244061.

```
0e24
4061
```

[for Fibre Channel Card (PW028FC4/PW028FC5)]:
To replace PCI cards with the following configurations, Fibre Channel switch and disk array device need to be reconfigured individually.
-If zone configuration by WWPN (World Wide Port Name) is done on Fibre Channel switch.
-If the Host Zoning function of disk array device is used.
For details, see the document of each product.
To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the twelve characters shown on a label on the back of the card. These characters represent the bottom twelve digit of the WWPN in hexadecimal form. The top four digit are fixed to 1000 in hexadecimal form.
For example, if the following label is shown on the back of the card, the WWPN of the replacement card is 10000000c9366037.

```
IEEE:0000c9366037
```

Note:
When changing Affinity configuration on SN200 series or other Fibre Channel switch, I/O to other devices is effected by the change, and may result in temporal errors.
I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.

a. Before extension of PCI cards, save the current execution result of the prtpicl(1M) command (current configuration at present.)

```
# prtpicl -v > /tmp/prtpicl.pre <Return>
```

b. Check the status of the slot.
The relationship of the position of a PCI card and format of "Ap_Id" is shown below.

Location of PCI slot	Element	Format of "Ap_Id"
Cabinet of PRIMEPOWER 900/1500/2500	Cabinet Number : **X** System Board Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:C**X**M0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** C**X**M0**Y**-PCI#**ZZ**
PCI / Disk Box	I/O Cabinet Number : **X** PCI / Disk Box Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:R**X**B0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** R**X**B0**Y**-PCI#**ZZ**
other than those above	Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:PCI#slot**ZZ** ·**Solaris 10 OE** PCI#**ZZ**

Below, an example of adding a PCI card to chassis number : 0, PCI/Disk BOX number : 1, physical slot number : 02, slot in PCI/Disk BOX(R0B01-PCI#slot02) is explained.
Check the status of the target slot is "empty unconfigured."

```
# cfgadm | grep R0B01-PCI#slot02 <Return>
pcipsy18:R0B01-PCI#slot02 unknown empty unconfigured unknown
```

c. To confirm the slot position at extension operation, blink the ALARM LED of Ap_Id displayed in procedure 4.b.

```
# cfgadm -x led=fault,mode=blink pcipsy18:R0B01-PCI#slot02 <Return>
```

d. After checking that the READY LED on the PCI slot to add the PCI card is off, add PCI cards and connect cable to devices. This operation is performed by our customer support.
e. Use the cfgadm(1M) command to check that the slot status of the added PCI card changed to "disconnected unconfigured".

```
# cfgadm pcipsy18:R0B01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy18:R0B01-PCI#slot02 unknown disconnected unconfigured unknown
```

5. Connect the PCI card
Connect the replaced PCI card using the cfgadm(1M) command with the configure option, or by pushing the button corresponding to the extension slot position. Note that the push button is only effective in multiuser mode. After the new PCI card is connected, use the cfgadm(1M) command and confirm that the slot status has changed to "connected configured."
If a large-scale configuration of I/O devices is connected to the PCI card in the target slot, command execution for status

confirmation may take time.

```
# cfgadm -c configure pcipsy18:R0B01-PCI#slot02 <Return>
# cfgadm pcipsy18:R0B01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy18:R0B01-PCI#slot02 mult/hp connected configured ok
```

6. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
   The daemons will be started.

```
# /etc/rc2.d/S99hbanyware start <Return>
# /etc/rc2.d/S99hbanywareDisc start <Return>
```

7. Update hardware configuration information of machine administration/ Start the hardware monitoring daemon.
   Execute the following commands to update hardware configuration information of machine administration and to restart the hardware monitoring daemon.

```
# /usr/sbin/FJSVmadm/postphp <Return>
```

8. Preparation to recognize devices for Fibre Channel
   When the Host Affinity function is being used with Fibre Channel SN200 series, Host Affinity must be configured for the device added.
   [for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:
   If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility
   WWPN zoning of SN200 series, Host affinity of Array disk device ETERNUS3000/ETERNUS6000/GR700/800 series and binding setting for fjpfca.conf/sd.conf of host can be added from SAN management window automatically.
   See "Operation guide" or "User's Manual" of each product for details.
   Before using this function, the following procedure 9.a.1. and 9.a.2. [except fcp-bind-target setting] are necessary.
   Moreover, begin from procedure 9.a.3. after executing this function.
   If you don't use SAN management function of the above products
   No procedure is necessary. Go to step 9.
   [for Fibre Channel Card (PW028FC4/PW028FC5)]:
   No procedure is necessary. Go to step 9.
   Note:
   When changing Affinity configuration on SN200 series, I/O to other devices is effected by the change, and may result in temporal errors.
   I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.
9. Set up driver
   Add the configuration of driver according to the following operation.
   As for file related drivers, additional configuration of the PCI card driver and the device driver is needed.
   a. Add configurations of PCI card driver
      [SCSI driver(Solaris OE: glm , FUJITSU PCI SCSI Adapter Driver)]
      Configuration is not required.
      [Fibre Channel driver (PW008FC2U/ W008FC2X/GP7B8FC1U/GP7B8FC1X)]
      1. After saving execution result of prtpicl (1M) command, take the difference between the result and the information obtained in procedure 4.a. to calculate the instance number of the fjpfca driver of the PCI card added.
         In the following example, instance number is 1, indicating that the interface name of the PCI card added is fjpfca1.
         Making the LED of the PCI card blink using the fc_adm command can specify the relation between the instance number and the slot position. The relation between the WWPN and instance number of the PCI card added can be known from the "fc_info -a" command.

```
# prtpicl -v > /tmp/prtpicl.pfca <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.pfca | more <Return>
:
> :status okay
> :devfs-path /pci@8d,2000/fibre-channel@1
> :driver-name fjpfca
> :binding-name pci10cf,105c
> :bus-addr 1
> :instance 1
> :_class obp-device
> :name fibre-channel
:
# /usr/sbin/FJSVpfca/fc_adm -l fjpfca1 <Return>
```

      2. Edit /kernel/drv/fjpfca.conf and add the following property definitions to the instance number from 9.a.1.
         port (topology classification , link speed)
         Define this property when PCI cards using Fabric connection are added.
         This definition is not needed with FC-AL connection.

fcp-bind-target(connection of target ID and WWN)
Define this property when disk array equipment using Fabric connections are added.
This definition is not needed with FC-AL connection.
max-throttle(number of maximum SCSI command issue)
This property is defined for restriction on simultaneous issue of SCSI commands.
The necessity and value of this definition depends on the specification of the disk array device, so refer to the user's manual of each equipment.
The following example shows the definition of a fjpfca1 PCI card (instance number : 1) and disk array equipment(target = 3) being added.

```
# vi /kernel/drv/fjpfca.conf <Return>
:
port=
"fjpfca0:nport",
"fjpfca1:nport:sp1"; <- added

fcp-bind-target=
"fjpfca0t0:0x50000e1000002501",
"fjpfca1t3:0x50000e1000002ab0"; <- added

max-throttle=
"fjpfca0t0:128",
"fjpfca1t3:240"; <- added
:
```

3. Execute the following command to make the fjpfca driver take in the added part.

```
# /usr/sbin/FJSVpfca/fc_config -v <Return>
```

[Fibre Channel driver (PW028FC4/PW028FC5)]
Configuration is not required.
Compare the output of prtpicl(1M) command with the output saved at 4.b and find the instance number of the added card.

b. Add device driver configuration
Add device driver configuration with the following procedures according to the I/O device type.
[Disk/Tape devices(Solaris OE : sd/st)]
This example is a case where a disk device of target=2, lun=0 is pre-defined in procedure 1. and added in procedure 5. If the device is a tape device, re-read "sd" as "st" in this procedure and perform the same operation.

1. Execute the following command to make the sd driver set up the added disk device.

```
# /usr/sbin/devfsadm <Return>
```

2. After saving the execution result of the prtpicl(1M) command, take the difference between the result and the information obtained in 4.a. and get the physical path name of additional disk device, then get the logical path name under /dev/dsk.
In the following example, "c2t2d0" is the logical path name of the disk device added.

```
# prtpicl -v > /tmp/prtpicl.post <Return>

Disk device
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep sd <Return>
> :devfs-path /pci@89,4000/scsi@2/sd@2,0
# ls -l /dev/dsk | grep /pci@89,4000/scsi@2/sd@2,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s0
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:a
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s1
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s2
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s3
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:d
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s4
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:e
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s5
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:f
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s6
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:g
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s7
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:h

Tape device
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep st <Return>
```

```
> :devfs-path /pci@89,4000/scsi@2/st@5,0
# ls -l /dev/rmt | grep /pci@89,4000/scsi@2/st@5,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1
-> ../../devices/pci@89,4000/scsi@2/st@5,0:
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1b
-> ../../devices/pci@89,4000/scsi@2/st@5,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1bn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:bn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1c
-> ../../devices/pci@89,4000/scsi@2/st@5,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1cb
-> ../../devices/pci@89,4000/scsi@2/st@5,0:cb
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1cbn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:cbn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1cn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:cn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1h
-> ../../devices/pci@89,4000/scsi@2/st@5,0:h
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1hb
-> ../../devices/pci@89,4000/scsi@2/st@5,0:hb
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1hbn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:hbn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1hn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:hn
```

3. If the device is a disk device, start the format(1M) command and configure labeling and partition(slice) information of the logical path name of added disks.
   If the device is a tape device, this procedure is not needed.

[Disk array device (hard disk driver : hddv)]

This example is a case where a disk array device of target=3, lun=0-2 is pre-defined in procedure 1. and added in procedure 5.

1. There may be a change of status depending on the system operating state after pre-definition in procedure 1., so check the LUN definition conflict between sd.conf and hddv.conf again. In case of "Check NG", the definitions are conflicting, so go back to procedure 1.e.

```
Check OK [ to procedure 9.b.2.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
/kernel/drv/sd.conf and /kernel/drv/hddv.conf seems to be correct

Check NG [ to procedure 1.e.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
NG ID = [ 3 ]
```

2. Execute the following command to make the hard disk driver set up the LUN.

```
# /usr/sbin/hddvadmdr <Return>
```

3. After saving execution result of the prtpicl command, get the physical path name of added LUN by taking the difference between the result and the information obtained in 4.a, and calculate the corresponding logical path name under /dev/dsk
   In the following example, "c3t3d0" is logical path name of added lun=0. The logical path name of lun=1,2 is set to "c3t3d1", "c3t3d2" respectively, because cXtYdZmeans X: PCI card number, Y: target number, Z: lun number .

```
# prtpicl -v > /tmp/prtpicl.post <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep hddv
<Return>
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,0
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,1
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,2
# ls -l /dev/dsk | grep /pci@89,2000/fibre-channel@1/hddv@3,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s0
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:a
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s1
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s2
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s3
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:d
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s4
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:e
```

```
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s5
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:f
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s6
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:g
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s7
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:h
```

4. Start the format(1M) command and configure labeling and partition(slice) information calculated in 9.b.3. to the logical path name of each extended LUN.

c. Add configure of PCI card driver

[SCSI driver(Solaris OE: glm , FUJITSU PCI SCSI Adapter Driver)]

No procedure is necessary. Go to step 10.

[Fibre Channel driver (PW008FC2U/ W008FC2X/GP7B8FC1U/GP7B8FC1X)]

No procedure is necessary. Go to step 10.

[Fibre Channel Card (PW028FC4/PW028FC5)]

Bind the auto mapped target connected with the card and modify the entries of lpfc.conf to match the requirements of the extended Fibre Channel Controller. These procedures are reflected on next boot time. In the following, indicate to bind the auto mapped target with the card..

```
# /usr/sbin/lpfc/lputil <Return>
LightPulse Common Utility for Solaris/SPARC. Version 1.6a8 (03/03/2004).
Copyright (c) 2003, Emulex Network Systems, Inc.

Emulex Fibre Channel Host Adapters Detected: 2
Host Adapter 0 (lpfc11) is an LP9802 (Ready Mode)
Host Adapter 1 (lpfc9) is an LP9802 (Ready Mode)

MAIN MENU
1. List Adapters
2. Adapter Information
3. Firmware Maintenance
4. Reset Adapter
5. Persistent Bindings
0. Exit
Enter choice => 5 <Return>

PERSISTENT BINDINGS MENU
1. Display Current Bindings
2. Display All Nodes
3. Duplicate Adapter Bindings
4. Bind Target Manually
5. Bind Automapped Targets
6. Delete Binding(s)
0. Return to Main Menu
Enter choice => 5 <Return>
0. lpfc11
1. lpfc9
Select an adapter => 0 <Return>
Automapped FCP Nodes:
Node Target WWPN WWNN
---- ------ --------- --------
Automapped FCP Node 0 50-06-0e-80-00-10-04-92 50-06-0e-80-00-10-04-92
Automapped FCP Node 1 50-06-0e-80-00-10-04-90 50-06-0e-80-00-10-04-90

Press the Enter or Return key to continue:
Bind all auto-mapped targets? (Y/N) => Y <Return>

Select Binding Method:
1. By Node Name
2. By Port Name
3. By D_ID
0. Cancel
Enter Choice => 2 <Return>
:
```

10. Setup redundant system

Execute the following commands to create a new redundant system.

The following procedure is described for MPHD/GRMPHD. If you use the redundancy software other than MPHD/GRMPHD, see the document for each product.

In case of MPHD, the commands need to be executed for each LUN, specifying the path name determined in 9.b.3 as a parameter.
The italic letters below are the new multipath names, and the underlined letters are the path names that compose the multipath.

```
MPHD
# /usr/opt/FJSViomp/bin/iompadm -c mphd new /dev/rdsk/c3t3d0s2 /dev/rdsk/c4t3d0s2
<Return>
IOMP: /dev/FJSVmphd/fiomp/adm2
Node:
/dev/FJSVmphd/rdsk/mphd2s0
/dev/FJSVmphd/rdsk/mphd2s1
/dev/FJSVmphd/rdsk/mphd2s2
/dev/FJSVmphd/rdsk/mphd2s3
/dev/FJSVmphd/rdsk/mphd2s4
/dev/FJSVmphd/rdsk/mphd2s5
/dev/FJSVmphd/rdsk/mphd2s6
/dev/FJSVmphd/rdsk/mphd2s7

GRMPD
# /usr/sbin/mplbconfig -nv <Return>
*** Phase 1: checking /dev/rdsk ***
*** Phase 2: checking multi path ***
*** Phase 3: analyzing path ***
Path : Action : Element path : LUN : Storage : Zone
mplb0 : exist : c1t4d0s2 c2t3d0s2 : 0 : GR720464f-12340001 :
:
mplb8 : new : c3t3d0s2 c4t3d0s2 : 0 : GR8404550- 000213 :
:
# /usr/sbin/mplbconfig -av <Return>
:
IOMP: /dev/FJSVmplb/fiomp/adm8
Node:
/dev/FJSVmplb/rdsk/mplb8s0
/dev/FJSVmplb/rdsk/mplb8s1
/dev/FJSVmplb/rdsk/mplb8s2
/dev/FJSVmplb/rdsk/mplb8s3
/dev/FJSVmplb/rdsk/mplb8s4
/dev/FJSVmplb/rdsk/mplb8s5
/dev/FJSVmplb/rdsk/mplb8s6
/dev/FJSVmplb/rdsk/mplb8s7
:
```

11. Setup applications
Add configuration for the application using the logical path name determined in 9.
[filesystem operation]
Create file system.
To mount at system start, add an entry in the /etc/vfstab file.

```
# newfs /dev/FJSVmphd/rdsk/mphd2s6 <Return>
# vi /etc/vfstab <Return>
:
/dev/FJSVmphd/dsk/mphd2s6 /dev/FJSVmphd/rdsk/mphd2s6 /mnt ufs 1 yes -
```

[raw access operation]
Configure applications.
For details, see the manual of each application.
[swap device]
Add swap device.
To make valid at system start, add an entry in the /etc/vfstab file.

```
# swap -a /dev/FJSVmphd/dsk/mphd2s4 <Return>
# vi /etc/vfstab <Return>
:
/dev/FJSVmphd/dsk/mphd2s4 - - swap - no -
:
# swap -l <Return>
swapfile dev swaplo blocks free
:
/dev/FJSVmphd/dsk/mphd2s4 32,164 16 788384 683680
```

12. Start applications
    Use the logical path name determined in 9. to start applications.
    [filesystem operation]
    Mount filesystem

```
# mount -F ufs /dev/FJSVmphd/dsk/mphd2s6 /mnt <Return>
```

    [raw access operation]
    Start applications.
    For details, see the manual of each application.
    [swap device]
    This procedure is not required.

3.2.1.3 Extension of PCI cards to redundant system

The procedure to add PCI cards to a redundant system in order to extend redundancy on a Solaris 8 OE system is explained with an example with GR multipath driver (GRMPD).

There are no additional patterns for Multipath Disk Control (MPHD).

If multipath software products other than GRMPD are being used, see the manual of each product.

No configuration is needed for applications when adding PCI cards to an existing redundant system.

1. Setup devices which will be added to system
   This is an example where a disk array controller of target=3, lun=0 is added with pre-definition to an existing disk array device. Extension using PCI Hot Plug cannot be done without definition, so devices must be defined before the system goes into operation.
   [If you use Solaris OE:sd]
   If this is the first time to pre-define a disk array device, begin with procedure 1.a. If this is not the first time to pre-define a disk array device, go to step 2.
   a. Modify /kernel/drv/sd.conf
      Ensure target=3,lun=0 target=3,lun=1 target=3,lun=3 are defined in /kernel/drv/sd.conf.
      If they are not defined or commented, modify /kernel/drv/sd.conf.

```
# vi /kernel/drv/sd.conf <Return>
:name="sd" class="scsi"
target=0 lun=0;
:
name="sd" class="scsi"
target=3 lun=0;
name="sd" class="scsi"
target=3 lun=1;
name="sd" class="scsi"
target=3 lun=2;
:
```

   b. Boot the system and reconfigure the kernel.

```
# touch /reconfigure <Return>
# /usr/sbin/shutdown -y -i6 -g0 <Return>
```

   [If you use hddv]
   If this is the first time to pre-define a disk array device, begin with procedure 1.a. If this is not the first time to pre-define a disk array device, begin with procedure 1.e.
   a. Check if /kernel/drv/hddv.conf exists
      Check if /kernel/drv/hddv.conf exists. If it exists, the hard disk driver is being installed, so start from procedure 1.c. If it does not exist, the system is being operated with none-active extension procedures, so start from procedure 1.b.

```
Not exist(new install) [ to procedure 1.c.]
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf: No such file or directory

Exists(operation with non-active extension procedures) [ to procedure 1.b.]
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf
```

   b. When operating with non-active extension procedures, execute the following commands and confirm that /kernel/drv/hddv.conf is deleted.

```
# hddvadm -i <Return>
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf: No such file or directory
```

c. Use the following command to create hddv.conf file for the pre-defined extension function. The message examples for "operation with non-active extension procedures" means that disk array device GR720 currently used with taget=1(lun=0) is registered twice on the sd/hddv driver.

```
New installation [ to procedure 1.e.]
# hddvadm -M <Return>

Operation with non-active extension procedures [ to procedure 1.d.]
# hddvadm -M <Return>
already ID= 1 exists. /devices/pci@1d,2000/fibre-channel@1/sd@1,0:a,raw : GR720
```

d. When performing pre-defined extension, the same target number cannot be registered in sd.conf and hddv.conf, so delete or comment out the conflicting definition parts in sd.conf file when definition in the two files conflict with each other.
The following example shows the case that target=1 is repeated.

```
# vi /kernel/drv/sd.conf <Return>
:
name="sd" class="scsi"
target=0 lun=0;
:
#name="sd" class="scsi"
target=1 lun=0;
#name="sd" class="scsi" Delete or comment out
target=1 lun=1; conflicting definition parts in sd/hddv
#name="sd" class="scsi"
target=1 lun=2;
:
```

A target number that is already used by the sd driver of the system disk or CD-ROM cannot be deleted. In this case, change the target number in hddv.conf and of the disk array device so that it does not conflict with sd.conf.

e. Edit the /kernel/drv/hddv.conf file created automatically by the hddvadm -M command, and remove comments of the LUN definition to pre-define and the LUN definition currently being used with non-active extension procedures.
If case active extension has been performed before and the LUN definition to extend the next procedures 1.f. - 1.g. are not needed.
If the target number of each disk array controller of a redundant system differs, add definition for each target number.
The following example shows target=3 , lun=0~2 for pre-defined extension and disk array device GR720 (target=1) in use with non-active extension procedures being registered.

```
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf
# vi /kernel/drv/hddv.conf <Return>
:
#name="hddv" class="scsi" target=0 lun=0;
:
#name="hddv" class="scsi" target=0 lun=7;
:
name="hddv" class="scsi" target=1 lun=0;
name="hddv" class="scsi" target=1 lun=1; Remove comments of the LUN in use
name="hddv" class="scsi" target=1 lun=2;
:
name="hddv" class="scsi" target=3 lun=0;
name="hddv" class="scsi" target=3 lun=1; Remove comments of extended LUN
name="hddv" class="scsi" target=3 lun=2;
#name="hddv" class="scsi" target=3 lun=3;
:
```

f. Check the LUN definition overlap between sd.conf and hddv.conf by executing hddvchk_conf command.
The message example for "Check NG" means that target=3 is defined in both files,
and the procedures must be performed again from procedure 1.d.
The followings are examples of execution of the FJSVhddv package installation to /opt. The path of the hddvchk_conf command depends on the installed directory.

```
Check OK [ to procedure 1.g.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
/kernel/drv/sd.conf and /kernel/drv/hddv.conf seems to be correct

Check NG [ to procedure 1.d.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
NG ID = [ 3 ]
```

g. Reconfigure the kernel , restart the system, and then start system operation.

```
# touch /reconfigure <Return>
# /usr/sbin/shutdown -y -i6 -g0 <Return>
```

2. Stop the machine administration hardware monitoring daemon
   Execute the following commands to stop the machine administration hardware monitoring daemon.

```
# /usr/sbin/FJSVmadm/prephp <Return>
```

3. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
   The daemons will be stopped.

```
# /etc/rc0.d/K10hbanyware stop <Return>
# /etc/rc0.d/K10hbanywareDisc stop <Return>
```

4. Add PCI cards
   Add PCI cards according to the following procedure.
   [for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:
   If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility
   No procedure is necessary. Go to step 5.
   If you don't use SAN management function of the above products
   To add PCI cards with the following configurations, Fibre Channel switch SN200 series and disk array device ETERNUS3000/ETERNUS6000/GR700/800 series need to be reconfigured individually.
   -If zone configuration by WWPN(World Wide Port Name) is done on SN200 series.
   -If the Host Affinity function of ETERNUS3000/ETERNUS6000/GR700/800 series is used.
   For details, see "SN200 Series Affinity User's Guide" or "ETERNUSmgr User Guide/GRmgr User Guide." If you use the Fibre Channel switch or disk array device other than described above, see the document of each product.
   To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the eight characters shown on a label on the front plate of the card. These characters represent the bottom eight digit of the WWPN in hexadecimal form. The top eight digit are fixed to 10000000 in hexadecimal form.
   For example, if the following label is shown on the front plate of the card, the WWPN of the replacement card is 100000000e244061.

```
0e24
4061
```

   [for Fibre Channel Card (PW028FC4/PW028FC5)]:
   To replace PCI cards with the following configurations, Fibre Channel switch and disk array device need to be reconfigured individually.
   -If zone configuration by WWPN (World Wide Port Name) is done on Fibre Channel switch.
   -If the Host Zoning function of disk array device is used.
   For details, see the document of each product.
   To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the twelve characters shown on a label on the back of the card. These characters represent the bottom twelve digit of the WWPN in hexadecimal form. The top four digit are fixed to 1000 in hexadecimal form.
   For example, if the following label is shown on the back of the card, the WWPN of the replacement card is 10000000c9366037.

```
IEEE:0000c9366037
```

   Note:
   When changing Affinity configuration on SN200 series or other Fibre Channel switch, I/O to other devices is effected by the change, and may result in temporal errors.
   I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.
   a. Before extension of PCI cards, save the current execution result of the prtpicl(1M) command (current configuration at present.)

```
# prtpicl -v > /tmp/prtpicl.pre <Return>
```

   b. Check the status of the slot.
      When adding PCI cards to a redundant configuration, several PCI cards may be added to the system. In this case, perform to procedures 4. on each card.
      The relationship of the position of a PCI card and format of "Ap_Id" is shown below.

Location of PCI slot	Element	Format of "Ap_Id"
Cabinet of PRIMEPOWER 900/1500/2500	Cabinet Number : **X** System Board Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:C**X**M0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** C**X**M0**Y**-PCI#**ZZ**
PCI / Disk Box	I/O Cabinet Number : **X** PCI / Disk Box Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:R**X**B0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** R**X**B0**Y**-PCI#**ZZ**
other than those above	Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:PCI#slot**ZZ** ·**Solaris 10 OE** PCI#**ZZ**

Below, an example of adding a PCI card to chassis number : 0, PCI/Disk BOX number : 1, physical slot number : 02, slot in PCI/Disk BOX(R0B01-PCI#slot02) is explained.
Check the status of the target slot is "empty unconfigured."

```
# cfgadm | grep R0B01-PCI#slot02 <Return>
pcipsy18:R0B01-PCI#slot02 unknown empty unconfigured unknown
```

c. To confirm the slot position at extension operation, blink the ALARM LED of Ap_Id displayed in procedure 4.b.

```
# cfgadm -x led=fault,mode=blink pcipsy18:R0B01-PCI#slot02 <Return>
```

d. After checking that the READY LED on the PCI slot to add the PCI card is off, add PCI cards and connect cable to devices. This operation is performed by our customer support.

e. Use the cfgadm(1M) command to check that the slot status of the added PCI card changed to "disconnected unconfigured".

```
# cfgadm pcipsy18:R0B01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy18:R0B01-PCI#slot02 unknown disconnected unconfigured unknown
```

5. Connect PCI cards
Connect the replaced PCI card using the cfgadm(1M) command with the configure option, or by pushing the button corresponding to the extension slot position. Note that the push button is only effective in multi-user mode. After the new PCI card is connected, use the cfgadm(1M) command and confirm that the slot status has changed to "connected configured."
If a large-scale configuration of I/O devices is connected to the PCI card in the target slot, command execution for status confirmation may take time.

```
# cfgadm -c configure pcipsy18:R0B01-PCI#slot02 <Return>
# cfgadm pcipsy18:R0B01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy18:R0B01-PCI#slot02 mult/hp connected configured ok
```

6. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
The daemons will be started.

```
# /etc/rc2.d/S99hbanyware start <Return>
# /etc/rc2.d/S99hbanywareDisc start <Return>
```

7. Update hardware configuration information of machine administration/ Start the hardware monitoring daemon.
Execute the following commands to update hardware configuration information of machine administration and to restart the hardware monitoring daemon.

```
# /usr/sbin/FJSVmadm/postphp <Return>
```

8. Preparation to recognize devices for Fibre Channel
When the Host Affinity function is being used with Fibre Channel SN200 series, Host Affinity must be configured for the device added.
[for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:
If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility
WWPN zoning of SN200 series, Host affinity of Array disk device ETERNUS3000/ETERNUS6000/GR700/800 series and binding setting for fjpfca.conf/sd.conf of host can be added from SAN management window automatically.
See "Operation guide" or "User's Manual" of each product for details.
Before using this function, the following procedure 9.a.1. and 9.a.2. [except fcp-bind-target setting] are necessary.
Moreover, begin from procedure 9.a.3. after executing this function.
If you don't use SAN management function of the above products
No procedure is necessary. Go to step 9.
[for Fibre Channel Card (PW028FC4/PW028FC5)]:
No procedure is necessary. Go to step 9

Note:
When changing Affinity configuration on SN200 series, I/O to other devices is effected by the change, and may result in temporal errors.
I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.

9. Set up driver
Add the configuration of driver according to the following operation.
As for file related drivers, additional configuration of the PCI card driver and the device driver is needed.
    a. Add configurations of PCI card driver
    [SCSI driver(Solaris OE: glm , FUJITSU PCI SCSI Adapter Driver)]
    Configuration is not required.
    [Fibre Channel driver (PW008FC2U/ W008FC2X/GP7B8FC1U/GP7B8FC1X)]
        1. After saving execution result of prtpicl (1M) command, take the difference between the result and the information obtained in procedure 4.a. to calculate the instance number of the fjpfca driver of the PCI card added.
        In the following example, instance number is 1, indicating that the interface name of the PCI card added is fjpfca1.
        Making the LED of the PCI card blink using the fc_adm command can specify the relation between the instance number and the slot position. The relation between the WWPN and instance number of the PCI card added can be known from the "fc_info -a" command.

```
# prtpicl -v > /tmp/prtpicl.pfca <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.pfca | more <Return>
:
> :status okay
> :devfs-path /pci@8d,2000/fibre-channel@1
> :driver-name fjpfca
> :binding-name pci10cf,105c
> :bus-addr 1
> :instance 1
> :_class obp-device
> :name fibre-channel
:# /usr/sbin/FJSVpfca/fc_adm -l fjpfca1 <Return>
```

        2. Edit /kernel/drv/fjpfca.conf and add the following property definitions to the instance number from 9.a.1.
        port (topology classification , link speed)
        Define this property when PCI cards using Fabric connection are added.
        This definition is not needed with FC-AL connection.
        fcp-bind-target(connection of target ID and WWN)
        Define this property when disk array equipment using Fabric connections are added.
        This definition is not needed with FC-AL connection.
        max-throttle(number of maximum SCSI command issue)
        This property is defined for restriction on simultaneous issue of SCSI commands.
        The necessity and value of this definition depends on the specification of the disk array device, so refer to the user's manual of each equipment.
        The following example shows the definition of a fjpfca1 PCI card (instance number : 1) and disk array equipment(target = 3) being added.

```
# vi /kernel/drv/fjpfca.conf <Return>
:
port=
"fjpfca0:nport",
"fjpfca1:nport:sp1"; <- added

fcp-bind-target=
"fjpfca0t0:0x50000e1000002501",
"fjpfca1t3:0x50000e1000002ab0"; <- added

max-throttle=
"fjpfca0t0:128",
"fjpfca1t3:240"; <- added
:
```

        3. Execute the following command to make the fjpfca driver take in the added part.

```
# /usr/sbin/FJSVpfca/fc_config -v <Return>
```

    [Fibre Channel driver (PW028FC4/PW028FC5)]
    Configuration is not required.
    Compare the output of prtpicl(1M) command with the output saved at 4.b and find the instance number of the

added card.

b. Add device driver configuration

Add device driver configuration with the following procedures according to the I/O device type.

[Disk/Tape devices(Solaris OE : sd/st)]

This example is a case where a disk device of target=2, lun=0 is pre-defined in procedure 1. and added in procedure 5. If the device is a tape device, re-read "sd" as "st" in this procedure and perform the same operation.

1. Execute the following command to make the sd driver set up the added disk device.

```
# /usr/sbin/devfsadm <Return>
```

2. After saving the execution result of the prtpicl(1M) command, take the difference between the result and the information obtained in 4.a. and get the physical path name of additional disk device, then get the logical path name under /dev/dsk.
   In the following example, "c2t2d0" is the logical path name of the disk device added.

```
# prtpicl -v > /tmp/prtpicl.post <Return>

Disk device
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep sd <Return>
> :devfs-path /pci@89,4000/scsi@2/sd@2,0
# ls -l /dev/dsk | grep /pci@89,4000/scsi@2/sd@2,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s0
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:a
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s1
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s2
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s3
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:d
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s4
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:e
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s5
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:f
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s6
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:g
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s7
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:h

Tape device
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep st <Return>
> :devfs-path /pci@89,4000/scsi@2/st@5,0
# ls -l /dev/rmt | grep /pci@89,4000/scsi@2/st@5,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1
-> ../../devices/pci@89,4000/scsi@2/st@5,0:
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1b
-> ../../devices/pci@89,4000/scsi@2/st@5,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1bn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:bn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1c
-> ../../devices/pci@89,4000/scsi@2/st@5,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1cb
-> ../../devices/pci@89,4000/scsi@2/st@5,0:cb
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1cbn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:cbn
lrwxrwxrwx 1 root root 41 Sep 20 22:53
1cn-> ../../devices/pci@89,4000/scsi@2/st@5,0:cn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1h
-> ../../devices/pci@89,4000/scsi@2/st@5,0:h
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1hb
-> ../../devices/pci@89,4000/scsi@2/st@5,0:hb
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1hbn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:hbn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1hn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:hn
```

3. If the device is a disk device, start the format(1M) command and configure labeling and partition(slice) information of the logical path name of added disks.
   If the device is a tape device, this procedure is not needed.

[Disk array device (hard disk driver : hddv)]

This example is a case where a disk array device of target=3, lun=0-2 is pre-defined in procedure 1. and added in

procedure 5.

1. There may be a change of status depending on the system operating state after pre-definition in procedure 1., so check the LUN definition conflict between sd.conf and hddv.conf again. In case of "Check NG", the definitions are conflicting, so go back to procedure 1.e.

```
Check OK [ to procedure 9.b.2.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
/kernel/drv/sd.conf and /kernel/drv/hddv.conf seems to be correct

Check NG [ to procedure 1.e.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
NG ID = [ 3 ]
```

2. Execute the following command to make the hard disk driver set up the LUN.

```
# /usr/sbin/hddvadmdr <Return>
```

3. After saving execution result of the prtpicl command, get the physical path name of added LUN by taking the difference between the result and the information obtained in 4.a, and calculate the corresponding logical path name under /dev/dsk
   In the following example, "c3t3d0" is logical path name of added lun=0. The logical path name of lun=1,2 is set to "c3t3d1", "c3t3d2" respectively, because cXtYdZmeans X: PCI card number, Y: target number, Z: lun number .

```
# prtpicl -v > /tmp/prtpicl.post <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep hddv
<Return>
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,0
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,1
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,2
# ls -l /dev/dsk | grep /pci@89,2000/fibre-channel@1/hddv@3,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s0
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:a
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s1
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s2
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s3
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:d
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s4
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:e
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s5
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:f
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s6
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:g
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s7
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:h
```

4. Start the format(1M) command and configure labeling and partition(slice) information calculated in 9.b.3. to the logical path name of each extended LUN.

c. Add configure of PCI card driver

[SCSI driver(Solaris OE: glm , FUJITSU PCI SCSI Adapter Driver)]

No procedure is necessary. Go to step 10.

[Fibre Channel driver (PW008FC2U/ W008FC2X/GP7B8FC1U/GP7B8FC1X)]

No procedure is necessary. Go to step 10.

[Fibre Channel Card (PW028FC4/PW028FC5)]

Bind the auto mapped target connected with the card and modify the entries of lpfc.conf to match the requirements of the extended Fibre Channel Controller. These procedures are reflected on next boot time. In the following, indicate to bind the auto mapped target with the card.

```
# /usr/sbin/lpfc/lputil <Return>
LightPulse Common Utility for Solaris/SPARC. Version 1.6a8 (03/03/2004).
Copyright (c) 2003, Emulex Network Systems, Inc.

Emulex Fibre Channel Host Adapters Detected: 2
Host Adapter 0 (lpfc11) is an LP9802 (Ready Mode)
Host Adapter 1 (lpfc9) is an LP9802 (Ready Mode)

MAIN MENU
1. List Adapters
2. Adapter Information
3. Firmware Maintenance
```

```
4. Reset Adapter
5. Persistent Bindings
0. Exit
Enter choice => 5 <Return>

PERSISTENT BINDINGS MENU
1. Display Current Bindings
2. Display All Nodes
3. Duplicate Adapter Bindings
4. Bind Target Manually
5. Bind Automapped Targets
6. Delete Binding(s)
0. Return to Main Menu
Enter choice => 5 <Return>
0. lpfc11
1. lpfc9
Select an adapter => 0 <Return>

Automapped FCP Nodes:
Node Target WWPN WWNN
---- ------ --------- --------
Automapped FCP Node 0 50-06-0e-80-00-10-04-92 50-06-0e-80-00-10-04-92
Automapped FCP Node 1 50-06-0e-80-00-10-04-90 50-06-0e-80-00-10-04-90

Press the Enter or Return key to continue:
Bind all auto-mapped targets? (Y/N) => Y <Return>

Select Binding Method:
1. By Node Name
2. By Port Name
3. By D_ID
0. Cancel
Enter Choice => 2 <Return>
:
```

10. Connect to redundant system
    The following procedure is described for MPHD/GRMPHD. If you use the redundancy software other than MPHD/GRMPHD, see the document for each product.
    To connect the added PCI card to the redundant system, execute the following command and confirm that the path name determined in procedure 9.b.3. (in underlined letters) is added.

```
# /usr/sbin/mplbconfig -nv <Return>
*** Phase 1: checking /dev/rdsk ***
*** Phase 2: checking multi path ***
*** Phase 3: analyzing path ***
Path : Action : Element path : LUN :Storage : Zone
mplb0 : exist : c1t4d0s2 c2t3d0s2 : 0 : GR720464f-12340001 :
:
mplb8 : add : c3t3d0s2 c4t3d0s2 c5t3d0s2: 0 : GR8404550- 000213 :
:
# /usr/sbin/mplbconfig -av <Return>
:
IOMP: /dev/FJSVmplb/fiomp/adm8
Node:
/dev/FJSVmplb/rdsk/mplb8s0
/dev/FJSVmplb/rdsk/mplb8s1
/dev/FJSVmplb/rdsk/mplb8s2
/dev/FJSVmplb/rdsk/mplb8s3
/dev/FJSVmplb/rdsk/mplb8s4
/dev/FJSVmplb/rdsk/mplb8s5
/dev/FJSVmplb/rdsk/mplb8s6
/dev/FJSVmplb/rdsk/mplb8s7
:
```

3.2.2 Solaris 9 OE or later

This section describes the procedures to extend PCI cards on Solaris 9 OE or later systems.

If you use Fibre Channel Card (PW028FC4/PW028FC5), ensure the automap function is effective. Boot the system after

modifying lpfc.conf.

```
# vi /kernel/drv/lpfc.conf <Return>

:
# If automap is set, SCSI IDs for all FCP nodes without
# persistent bindings will be automatically generated.
# If new FCP devices are added to the network when the system is down,
# there is no guarantee that these SCSI IDs will remain the same
# when the system is booted again.
# The bind method of the port is used as the binding method of
# automap devices to preserve SCSI IDs between link down and link up.
# If automap is 0, only devices with persistent bindings will be
# recognized by the system.
automap=1; <-- set to 1
:
```

3.2.2.1 Extension of PCI cards on non-redundant system

Procedures to add PCI cards without making them redundant on a Solaris 9 OE or later system are explained here.

1. Stop the machine administration hardware monitoring daemon Execute the following commands to stop the machine administration hardware error monitoring daemon.

   ```
   # /usr/sbin/FJSVmadm/prephp <Return>
   ```

2. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following. The daemons will be stopped.

   ```
   # /etc/rc0.d/K10hbanyware stop <Return>
   # /etc/rc0.d/K10hbanywareDisc stop <Return>
   ```

3. Add PCI cards
   Add PCI cards according to the following procedure.
   [for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:
   If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility
   No procedure is necessary. Go to step 7.
   If you don't use SAN management function of the above products
   To add PCI cards with the following configurations, Fibre Channel switch SN200 series and disk array device ETERNUS3000/ETERNUS6000/GR700/800 series need to be reconfigured individually.
   -If zone configuration by WWPN(World Wide Port Name) is done on SN200 series.
   -If the Host Affinity function of ETERNUS3000/ETERNUS6000/GR700/800 series is used.
   For details, see "SN200 Series Affinity User's Guide" or "ETERNUSmgr User Guide/GRmgr User Guide." If you use the Fibre Channel switch or disk array device other than described above, see the document of each product.
   To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the eight characters shown on a label on the front plate of the card. These characters represent the bottom eight digit of the WWPN in hexadecimal form. The top eight digit are fixed to 10000000 in hexadecimal form.
   For example, if the following label is shown on the front plate of the card, the WWPN of the replacement card is 100000000e244061.

   ```
   0e24
   4061
   ```

   [for Fibre Channel Card (PW028FC4/PW028FC5)]:
   To replace PCI cards with the following configurations, Fibre Channel switch and disk array device need to be reconfigured individually.
   -If zone configuration by WWPN (World Wide Port Name) is done on Fibre Channel switch.
   -If the Host Zoning function of disk array device is used.
   For details, see the document of each product.
   To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the twelve characters shown on a label on the back of the card. These characters represent the bottom twelve digit of the WWPN in hexadecimal form. The top four digit are fixed to 1000 in hexadecimal form.
   For example, if the following label is shown on the back of the card, the WWPN of the replacement card is 10000000c9366037.

   ```
   IEEE:0000c9366037
   ```

   Note:
   When changing Affinity configuration on SN200 series or other Fibre Channel switch, I/O to other devices is effected by the change, and may result in temporal errors.
   I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.

a. Before extension of PCI cards, save the current execution result of prtpicl(1M) command (composition information at present)

```
# prtpicl -v > /tmp/prtpicl.pre <Return>
```

b. Check the status of the slot.
The relationship of the position of a PCI card and format of "Ap_Id" is shown below.

Location of PCI slot	Element	Format of "Ap_Id"
Cabinet of PRIMEPOWER 900/1500/2500	Cabinet Number : **X** System Board Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:C**X**M0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** C**X**M0**Y**-PCI#**ZZ**
PCI / Disk Box	I/O Cabinet Number : **X** PCI / Disk Box Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:R**X**B0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** R**X**B0**Y**-PCI#**ZZ**
other than those above	Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:PCI#slot**ZZ** ·**Solaris 10 OE** PCI#**ZZ**

Below, an example of adding a PCI card to chassis number : 0, system board number : 1, physical slot number : 02,slot in chassis(C0M01-PCI#slot02) is explained.
Check the status of the target slot is "empty unconfigured."

```
# cfgadm | grep C0M01-PCI#slot02 <Return>
pcipsy15:C0M01-PCI#slot02 unknown empty unconfigured unknown
```

c. To confirm the slot position at extension operation, blink the ALARM LED of Ap_Id displayed in procedure 3.b.

```
# cfgadm -x led=fault,mode=blink pcipsy15:C0M01-PCI#slot02 <Return>
```

d. After checking that the READY LED on the PCI slot to add the PCI card is off, add PCI cards and connect cable to devices. This operation is performed by our customer support.

e. Use the cfgadm(1M) command to check that the slot status of the added PCI card changed to "disconnected unconfigured".

```
# cfgadm pcipsy15:C0M01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy15:C0M01-PCI#slot02 unknown disconnected unconfigured unknown
```

4. Connect PCI cards
Connect the replaced PCI card using the cfgadm(1M) command with the configure option, or by pushing the button corresponding to the extension slot position. Note that the push button is only effective in multiuser mode. After the new PCI card is connected, use the cfgadm(1M) command and confirm that the slot status has changed to "connected configured."
If a large-scale configuration of I/O devices is connected to the PCI card in the target slot, command execution for status confirmation may take time.

```
# cfgadm -c configure pcipsy15:C0M01-PCI#slot02 <Return>
# cfgadm pcipsy15:C0M01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy15:C0M01-PCI#slot02 mult/hp connected configured ok
```

5. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
The daemons will be started.

```
# /etc/rc2.d/S99hbanyware start <Return>
# /etc/rc2.d/S99hbanywareDisc start <Return>
```

6. Update hardware configuration information of machine administration/ Start the hardware monitoring daemon.
Execute the following commands to update hardware configuration information of machine administration and to restart the hardware monitoring daemon.

```
# /usr/sbin/FJSVmadm/postphp <Return>
```

7. Preparation to recognize devices for Fibre Channel
When the Host Affinity function is being used with Fibre Channel SN200 series, Host Affinity must be configured for the device added.
[for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:
If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility
WWPN zoning of SN200 series, Host affinity of Array disk device ETERNUS3000/ETERNUS6000/GR700/800 series and binding setting for fjpfca.conf/sd.conf of host can be added from SAN management window automatically.
See "Operation guide" or "User's Manual" of each product for details.
Before using this function, the following procedure 8.a.1. and 8.a.2. [except fcp-bind-target setting] are necessary.
Moreover, begin from procedure 8.a.3. after executing this function.

If you don't use SAN management function of the above products
No procedure is necessary. Go to step 8.
[for Fibre Channel Card (PW028FC4/PW028FC5)]:
No procedure is necessary. Go to step 8.

Note:
When changing Affinity configuration on SN200 series, I/O to other devices is effected by the change, and may result in temporal errors.
I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.

8. Set up driver
   Add the configuration of driver according to the following operation.
   As for file related drivers, additional configuration of the PCI card driver and the device driver is needed.
   a. Add the configuration of PCI cards driver
      [SCSI driver (Solaris OE: glm , FUJITSU PCI SCSI Adapter Driver)]
      Configuration is not required.
      [Fibre Channel driver (PW008FC3U/PW008FC2U/ GP7B8FC1U)]
      1. After saving execution result of prtpicl (1M) command, take the difference between the result and the information obtained in procedure 3.a. to calculate the instance number of the fjpfca driver of the PCI card added. In the following example, instance number is 1, indicating that the interface name of the PCI card added is fjpfca1. Making the LED of the PCI card blink using the fc_adm command can specify the relation between the instance number and the slot position. The relation between the WWPN and instance number of the PCI card added can be known from the "fc_info -a" command

```
# prtpicl -v > /tmp/prtpicl.pfca <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.pfca | more <Return>
:
> :status okay
> :devfs-path /pci@8d,2000/fibre-channel@1
> :driver-name fjpfca
> :binding-name pci10cf,105c
> :bus-addr 1
> :instance 1
> :_class obp-device
> :name fibre-channel
:
# /usr/sbin/FJSVpfca/fc_adm -l fjpfca1 <Return>
```

      2. Edit /kernel/drv/fjpfca.conf and add the following property definitions to the instance number from 8.a.1.
         port (topology classification , link speed)
         Define this property when PCI cards using Fabric connection are added.
         This definition is not needed with FC-AL connection.
         fcp-bind-target(connection of target ID and WWN)
         Define this property when disk array equipment using Fabric connections are added.
         This definition is not needed with FC-AL connection.
         max-throttle(number of maximum SCSI command issue)
         This property is defined for restriction on simultaneous issue of SCSI commands.
         The necessity and value of this definition depends on the specification of the disk array device, so refer to the user's manual of each equipment.
         The following example shows the definition of a fjpfca1 PCI card (instance number : 1) and disk array equipment(target = 3) being added.

```
# vi /kernel/drv/fjpfca.conf <Return>
:
port=
"fjpfca0:nport",
"fjpfca1:nport:sp1"; <- added

fcp-bind-target=
"fjpfca0t0:0x50000e1000002501",
"fjpfca1t3:0x50000e1000002ab0"; <- added

max-throttle=
"fjpfca0t0:128",
"fjpfca1t3:240"; <- added
:
```

      3. Execute the following command to make the fjpfca driver take in the added part.

```
# /usr/sbin/FJSVpfca/fc_config -v <Return>
```

[Fibre Channel driver (PW028FC4/PW028FC5)]
Configuration is not required.
Compare the output of prtpicl(1M) command with the output saved at 3.b and find the instance number of the added card.

b. Add device driver configuration
Add device driver configuration with the following procedures according to the I/O device type.
[Disk/Tape devices(Solaris OE : sd/st)]
This example is a case where a disk device of target=2, lun=0 is pre-defined in procedure 1. and added in procedure 4. If the device is a tape device, re-read "sd" as "st" in this procedure and perform the same operation.

1. See /kernel/drv/sd.conf and check that target=2 and lun=0 are defined. When this definition does not exist, add the definition. If it is commented out, remove comments.

```
Disk equipment
# vi /kernel/drv/sd.conf <Return>
:
name="sd" class="scsi"
target=0 lun=0;
:
name="sd" class="scsi" In case the definition does not exist,
target=2 lun=0; add or remove comments

Tape equipment
# vi /kernel/drv/st.conf <Return>
:
name="st" class="scsi"
target=0 lun=0;
:
name="st" class="scsi" In case the definition does not exist,
target=5 lun=0; add or remove comments
```

2. To make the sd driver set up the disk device added, execute the following commands. When the commands are executed, the following messages are displayed but do not effect performance. Similar messages are displayed when a tape device already exists when a tape device is added, but does not effect performance.

```
Disk device
# update_drv -f sd <Return>
Cannot unload module: sd
Will be unloaded upon reboot.
Forcing update of sd.conf.

Tape device
# update_drv -f st <Return>
```

3. After saving the execution result of the prtpicl(1M) command, take the difference between the result and the information obtained in 3.a. and get the physical path name of additional disk device, then get the logical path name under /dev/dsk. In the following example, **"c2t2d0"** is the logical path name of the disk device added.

```
# prtpicl -v > /tmp/prtpicl.post <Return>
Disk equipment
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep sd <Return>
> :devfs-path /pci@89,4000/scsi@2/sd@2,0
# ls -l /dev/dsk | grep /pci@89,4000/scsi@2/sd@2,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s0
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:a
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s1
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s2
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s3
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:d
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s4
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:e
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s5
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:f
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s6
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:g
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c2t2d0s7
```

```
-> ../../devices/pci@89,4000/scsi@2/sd@2,0:h

Tape equipment
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep st <Return>
> :devfs-path /pci@89,4000/scsi@2/st@5,0
# ls -l /dev/rmt | grep /pci@89,4000/scsi@2/st@5,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1
-> ../../devices/pci@89,4000/scsi@2/st@5,0:
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1b
-> ../../devices/pci@89,4000/scsi@2/st@5,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1bn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:bn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1c
-> ../../devices/pci@89,4000/scsi@2/st@5,0:c

lrwxrwxrwx 1 root root 41 Sep 20 22:53 1cb
-> ../../devices/pci@89,4000/scsi@2/st@5,0:cb
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1cbn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:cbn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1cn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:cn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1h
-> ../../devices/pci@89,4000/scsi@2/st@5,0:h
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1hb
-> ../../devices/pci@89,4000/scsi@2/st@5,0:hb
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1hbn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:hbn
lrwxrwxrwx 1 root root 41 Sep 20 22:53 1hn
-> ../../devices/pci@89,4000/scsi@2/st@5,0:hn
```

4. If the device is a disk device, start the format(1M) command and configure labeling and partition(slice) information of the logical path name of added disks. If the device is a tape device, this procedure is not needed.

[Disk array devices(hard disk driver : hddv)]

This is an example where an disk array device at target=3, lun=0-2 is pre-defined in procedure 4.
If this is the first time to pre-define a disk array device, begin with procedure 8.b.1. If this is not the first time to pre-define a disk array device, begin with procedure 8.b.5.

1. Check if /kernel/drv/hddv.conf exists
   Check if /kernel/drv/hddv.conf exists. If it exists, the hard disk driver is being installed, so start from procedure 8.b.3. If it does not exist, the system is being operated with none-active extension procedures, so start from procedure 8.b.2.

```
Not exist (new install) [ to procedure 8.b.3.]
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf: No such file or directory

Exists(operation with non-active extension procedures) [ to procedure 8.b.2.]
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf
```

2. When operating with non-active extension procedures, execute the following commands and confirm that /kernel/drv/hddv.conf is deleted.

```
# hddvadm -i <Return>
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf: No such file or directory
```

3. Use the following command to create hddv.conf file for the active extension function. The message examples for "operation with non-active extension procedures" means that disk array device GR720 currently used with taget=1(lun=0) is registered twice on the sd/hddv driver.

```
New installation [ to procedure 8.b.5.]
# hddvadm -M <Return>

Operation with non-active extension procedures [ to procedure 8.b.4.]
# hddvadm -M <Return>
already ID= 1 exists. /devices/pci@1d,2000/fibre-channel@1/sd@1,0:a,raw :
GR720
```

4. When performing pre-defined extension, the same target number cannot be registered in sd.conf and hddv.conf, so delete or comment out the conflicting definition parts in sd.conf file when definition in the two files conflict with each other. The following example shows the case that target=1 is repeated.

```
# vi /kernel/drv/sd.conf <Return>
:
name="sd" class="scsi"
target=0 lun=0;
:
#name="sd" class="scsi"
target=1 lun=0;
#name="sd" class="scsi" Delete or comment out
target=1 lun=1; the duplication definition parts in sd/hddv
#name="sd" class="scsi"
target=1 lun=2;
:
```

A target number that is already used by the sd driver of the system disk or CD-ROM cannot be deleted. In this case, change the target number in hddv.conf and of the disk array device so that it does not conflict with sd.conf.

5. Edit the /kernel/drv/hddv.conf file created automatically by the hddvadm -M command, and remove comments of the LUN definition to pre-define and the LUN definition currently being used with non-active extension procedures. If case active extension has been performed before and the LUN definition to extend the next procedures 1.f. - 1.g. are not needed. The following example shows target=3 , lun=0~2 for pre-defined extension and disk array device GR720 (target=1) in use with non-active extension procedures being registered.

```
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf
# vi /kernel/drv/hddv.conf <Return>
:
#name="hddv" class="scsi" target=0 lun=0;
:
#name="hddv" class="scsi" target=0 lun=7;
:
name="hddv" class="scsi" target=1 lun=0;
name="hddv" class="scsi" target=1 lun=1; Remove comments of the LUN in use
name="hddv" class="scsi" target=1 lun=2;
:
name="hddv" class="scsi" target=3 lun=0;
name="hddv" class="scsi" target=3 lun=1; Remove comments of extended LUN
name="hddv" class="scsi" target=3 lun=2;
#name="hddv" class="scsi" target=3 lun=3;
:
```

6. Check the LUN definition overlap between sd.conf and hddv.conf by executing hddvchk_conf command. The message example for "Check NG" means that target=3 is defined in both files, and the procedures must be performed again from procedure 8.b.4. The followings are examples of execution of the FJSVhddv package installation to /opt. The path of the hddvchk_conf command depends on the installed directory.

```
Check OK [ to procedure 8.b.7.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
/kernel/drv/sd.conf and /kernel/drv/hddv.conf seems to be correct

Check NG [ to procedure 8.b.4.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
NG ID = [ 3 ]
```

7. Execute the following command in order to make the hard disk driver set up the LUN added.

```
# update_drv -f hddv <Return>
```

In case disk array equipment currently used exists, the following messages are displayed but do not effect performance.

```
# update_drv -f hddv <Return>
Cannot unload module: hddv
Will be unloaded upon reboot.
Forcing update of hddv.conf.
```

8. After saving execution result of the prtpicl(1M) command, get the physical path name of added LUN by taking the difference between the result and the information obtained in 3.a, and calculate the corresponding logical path name under /dev/dsk. In the following example, **"c3t3d0"** is logical path name of added lun=0. The logical path name of lun=1,2 is set to **"c3t3d1"**, **"c3t3d2"** respectively, because cXtYdZmeans X: PCI card number, Y: target number, Z: lun number .

```
# prtpicl -v > /tmp/prtpicl.post <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep hddv
<Return>
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,0
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,1
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,2
# ls -l /dev/dsk | grep /pci@89,2000/fibre-channel@1/hddv@3,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s0
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:a
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s1
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s2
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s3
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:d
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s4
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:e
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s5
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:f
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s6
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:g
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s7
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:h
```

9. Start the format(1M) command and configure labeling and partition(slice) information calculated in 8.b.8. to the logical path name of each extended LUN.

c. Add configure of PCI card driver

[SCSI driver(Solaris OE: glm , FUJITSU PCI SCSI Adapter Driver)]

No procedure is necessary. Go to step 9.

[Fibre Channel driver (PW008FC3U/PW008FC2U/ GP7B8FC1U)]

No procedure is necessary. Go to step 9.

[Fibre Channel Card (PW028FC4/PW028FC5)]

Bind the auto mapped target connected with the card and modify the entries of lpfc.conf to match the requirements of the extended Fibre Channel Controller. These procedures are reflected on next boot time. In the following, indicate to bind the auto mapped target with the card..

```
# /usr/sbin/lpfc/lputil<Return>
LightPulse Common Utility for Solaris/SPARC. Version 1.6a8 (03/03/2004).
Copyright (c) 2003, Emulex Network Systems, Inc.

Emulex Fibre Channel Host Adapters Detected: 2
Host Adapter 0 (lpfc11) is an LP9802 (Ready Mode)
Host Adapter 1 (lpfc9) is an LP9802 (Ready Mode)

MAIN MENU
1. List Adapters
2. Adapter Information
3. Firmware Maintenance
4. Reset Adapter
5. Persistent Bindings
0. Exit
Enter choice => 5 <Return>

PERSISTENT BINDINGS MENU
1. Display Current Bindings
2. Display All Nodes
3. Duplicate Adapter Bindings
4. Bind Target Manually
5. Bind Automapped Targets
6. Delete Binding(s)
0. Return to Main Menu
Enter choice => 5 <Return>
0. lpfc11
1. lpfc9
Select an adapter => 0 <Return>

Automapped FCP Nodes:
Node Target WWPN WWNN
```

```
---- ------ --------- --------
Automapped FCP Node 0 50-06-0e-80-00-10-04-92 50-06-0e-80-00-10-04-92
Automapped FCP Node 1 50-06-0e-80-00-10-04-90 50-06-0e-80-00-10-04-90

Press the Enter or Return key to continue:
Bind all auto-mapped targets? (Y/N) => Y <Return>

Select Binding Method:
1. By Node Name
2. By Port Name
3. By D_ID
0. Cancel
Enter Choice => 2 <Return>
:
```

9. Setup applications
   Add configuration for the application using the logical path name determined in 8.b.
   [Disk device(filesystem operation)]
   Create file system.
   To mount at system start, add an entry in the /etc/vfstab file.

```
# newfs /dev/rdsk/c2t2d0s6 <Return>
# vi /etc/vfstab <Return>
:
/dev/dsk/c2t2d0s6 /dev/rdsk/c2t2d0s6 /mnt ufs 1 yes -
:
```

   [Disk device(raw access operation)/Tape device]
   Configure applications.
   For details, see the manual of each application.
   [Disk device(swap device)]
   Add swap device.
   To make valid at system start, add an entry in the /etc/vfstab file.

```
# swap -a /dev/dsk/c2t2d0s4 <Return>
# vi /etc/vfstab <Return>
:
/dev/dsk/c2t2d0s4 - - swap - no -
:
# swap -l <Return>
swapfile dev swaplo blocks free
:
/dev/dsk/c2t2d0s4 32,164 16 788384 683680
```

10. Start applications
    Use the logical path name determined in 8.b. to start applications.
    [Disk device(filesystem operation)]
    Mount filesystem

```
# mount -F ufs /dev/dsk/c2t2d0s6 /mnt <Return>
```

    [Disk device(raw access operation)/Tape device]
    Start applications.
    For details, see the manual of each application.
    [Disk device(swap device)]
    This procedure is not required.

3.2.2.2 Extension of PCI cards with new redundant system

The procedure to add PCI cards to a new redundant system on a Solaris 9 OE or later system is explained with examples for the multipath software below.

*Multipath Disk Control (MPHD)

*GR Multipath Driver (GRMPD)

an example with GR multipath driver (GRMPD).

If other redundant software is used, see the manual of each product.

1. Stop the machine administration hardware monitoring daemon
   Use the following command to stop the hardware monitoring daemon of machine administration.

```
# /usr/sbin/FJSVmadm/prephp <Return>
```

2. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
   The daemons will be stopped.

```
# /etc/rc0.d/K10hbanyware stop <Return>
# /etc/rc0.d/K10hbanywareDisc stop <Return>
```

3. Add PCI cards
   Add PCI cards according to the following procedure.
   [for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:
   If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility
   No procedure is necessary. Go to step 4.
   If you don't use SAN management function of the above products
   To add PCI cards with the following configurations, Fibre Channel switch SN200 series and disk array device ETERNUS3000/ETERNUS6000/GR700/800 series need to be reconfigured individually.
   -If zone configuration by WWPN(World Wide Port Name) is done on SN200 series.
   -If the Host Affinity function of ETERNUS3000/ETERNUS6000/GR700/800 series is used.
   For details, see "SN200 Series Affinity User's Guide" or "ETERNUSmgr User Guide/GRmgr User Guide." If you use the Fibre Channel switch or disk array device other than described above, see the document of each product.
   To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the eight characters shown on a label on the front plate of the card. These characters represent the bottom eight digit of the WWPN in hexadecimal form. The top eight digit are fixed to 10000000 in hexadecimal form.
   For example, if the following label is shown on the front plate of the card, the WWPN of the replacement card is 100000000e244061.

```
0e24
4061
```

   [for Fibre Channel Card (PW028FC4/PW028FC5)]:
   To replace PCI cards with the following configurations, Fibre Channel switch and disk array device need to be reconfigured individually.
   -If zone configuration by WWPN (World Wide Port Name) is done on Fibre Channel switch.
   -If the Host Zoning function of disk array device is used.
   For details, see the document of each product.
   To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the twelve characters shown on a label on the back of the card. These characters represent the bottom twelve digit of the WWPN in hexadecimal form. The top four digit are fixed to 1000 in hexadecimal form.
   For example, if the following label is shown on the back of the card, the WWPN of the replacement card is 10000000c9366037.

```
IEEE:0000c9366037
```

   Note:
   When changing Affinity configuration on SN200 series or other Fibre Channel switch, I/O to other devices is effected by the change, and may result in temporal errors.
   I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.
   a. Before extension of PCI cards, save the current execution result of the prtpicl(1M) command (current configuration at present.)

```
# prtpicl -v > /tmp/prtpicl.pre <Return>
```

   b. Check the status of the slot.
      The relationship of the position of a PCI card and format of "Ap_Id" is shown below.

Location of PCI slot	Element	Format of "Ap_Id"
Cabinet of PRIMEPOWER 900/1500/2500	Cabinet Number : **X** System Board Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:C**X**M0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** C**X**M0**Y**-PCI#**ZZ**
PCI / Disk Box	I/O Cabinet Number : **X** PCI / Disk Box Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:R**X**B0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** R**X**B0**Y**-PCI#**ZZ**
other than those above	Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:PCI#slot**ZZ** ·**Solaris 10 OE** PCI#**ZZ**

Below, an example of adding a PCI card to chassis number **: 0**, PCI/Disk BOX number : **1**, physical slot number : **02**, slot in PCI/Disk BOX(R**0**B0**1**-PCI#slot**02**) is explained.
Check the status of the target slot is "empty unconfigured."

```
# cfgadm | grep R0B01-PCI#slot02 <Return>
pcipsy18:R0B01-PCI#slot02 unknown empty unconfigured unknown
```

c. To confirm the slot position at extension operation, blink the ALARM LED of Ap_Id displayed in procedure 3.b.

```
# cfgadm -x led=fault,mode=blink pcipsy18:R0B01-PCI#slot02 <Return>
```

d. After checking that the READY LED on the PCI slot to add the PCI card is off, add PCI cards and connect cable to devices. This operation is performed by our customer support.

e. Use the cfgadm(1M) command to check that the slot status of the added PCI card changed to "disconnected unconfigured".

```
# cfgadm pcipsy18:R0B01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy18:R0B01-PCI#slot02 unknown disconnected unconfigured unknown
```

4. Connect the PCI card
Connect the replaced PCI card using the cfgadm(1M) command with the configure option, or by pushing the button corresponding to the extension slot position. Note that the push button is only effective in multiuser mode. After the new PCI card is connected, use the cfgadm(1M) command and confirm that the slot status has changed to "connected configured."
If a large-scale configuration of I/O devices is connected to the PCI card in the target slot, command execution for status confirmation may take time.

```
# cfgadm -c configure pcipsy18:R0B01-PCI#slot02 <Return>
# cfgadm pcipsy18:R0B01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy18:R0B01-PCI#slot02 mult/hp connected configured ok
```

5. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
The daemons will be started.

```
# /etc/rc2.d/S99hbanyware start <Return>
# /etc/rc2.d/S99hbanywareDisc start <Return>
```

6. Update hardware configuration information of machine administration/ Start the hardware monitoring daemon. Execute the following commands to update hardware configuration information of machine administration and to restart the hardware monitoring daemon.

```
# /usr/sbin/FJSVmadm/postphp <Return>
```

7. Preparation to recognize devices for Fibre Channel
When the Host Affinity function is being used with Fibre Channel SN200 series, Host Affinity must be configured for the device added.
[for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:
If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility
WWPN zoning of SN200 series, Host affinity of Array disk device ETERNUS3000/ETERNUS6000/GR700/800 series and binding setting for fjpfca.conf/sd.conf of host can be added from SAN management window automatically.
See "Operation guide" or "User's Manual" of each product for details.
Before using this function, the following procedure 8.a.1. and 8.a.2. [except fcp-bind-target setting] are necessary.
Moreover, begin from procedure 8.a.3. after executing this function.
If you don't use SAN management function of the above products
No procedure is necessary. Go to step 8.
[for Fibre Channel Card (PW028FC4/PW028FC5)]:
No procedure is necessary. Go to step 8.
Note:
When changing Affinity configuration on SN200 series, I/O to other devices is effected by the change, and may result in temporal errors.
I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.

8. Set up driver
Add driver configurations with the operation below.
With file related drivers, configuration for the PCI card driver and the device driver is needed.

a. Add configuration for PCI card driver
[SCSI driver(Solaris OE:glm, FUJITSU PCI SCSI Adapter Driver)]
Configuration is not required.
[Fibre Channel driver (PW008FC3U/PW008FC2U/ GP7B8FC1U)]

1. After saving execution result of prtpicl (1M) command, take the difference between the result and the information obtained in procedure 3.a. to calculate the instance number of the fjpfca driver of the PCI card added.

In the following example, instance number is 1, indicating that the interface name of the PCI card added is fjpfca1.
Making the LED of the PCI card blink using the fc_adm command can specify the relation between the instance number and the slot position. The relation between the WWPN and instance number of the PCI card added can be known from the "fc_info -a" command.

```
# prtpicl -v > /tmp/prtpicl.pfca <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.pfca | more <Return>
:
> :status okay
> :fru PCI slot(PCI#02 at Rack#0,IO_BOX#1)
> :component-name R0B01-PCI#02
> :devfs-path /pci@8d,2000/fibre-channel@1
> :driver-name fjpfca
> :binding-name pci10cf,105c
> :bus-addr 1
> :instance 1
> :_class obp-device
> :name fibre-channel
:
```

2. Edit the /kernel/drv/fjpfca.conf file, and add the following property definitions to the instance number determined in 8.a.1.
   port(type of topology, link speed)
   Defined when adding PCI cards with Fabric connection.
   This definition is not needed with FC-AL connection.
   fcp-bind-target(connection between target ID and WWN)
   Defined when adding disk array with Fabric connection.
   This definition is not needed with FC-AL connection.
   max-throttle(maximum issued SCSI commands)
   Defined to limit the number of SCSI commands issued at the same time.
   The need and value of this definition depends on the disk array device, so refer to the manuals of each disk array device. Below is an example where definitions for a PCI card at fjpfca1(instance number 1) and a disk array device at target=3 is added.

```
# vi /kernel/drv/fjpfca.conf <Return>
:
port=
"fjpfca0:nport",
"fjpfca1:nport:sp1"; <- add

fcp-bind-target=
"fjpfca0t0:0x50000e1000002501",
"fjpfca1t3:0x50000e1000002ab0"; <- add

max-throttle=
"fjpfca0t0:128",
"fjpfca1t3:240"; <- add
:
```

3. Execute the following command to make the fjpfca driver set up the additional part.

```
# /usr/sbin/FJSVpfca/fc_config -v <Return>
```

   [Fibre Channel driver (PW028FC4/PW028FC5)]
   Configuration is not required.
   Compare the output of prtpicl(1M) command with the output saved at 3.b and find the instance number of the added card.

b. Add configuration of device driver
   This is an example where an disk array device in redundant configuration at target=3, lun=0-2 is added in procedure 4.
   If this is the first time to pre-define a disk array device, begin with procedure 8.b.1. If this is not the first time to pre-define a disk array device, begin with procedure 8.b.5.
   1. Check if /kernel/drv/hddv.conf exists
      Check if /kernel/drv/hddv.conf exists. If it exists, the hard disk driver is being installed, so start from procedure 8.b.3. If it does not exist, the system is being operated with none-active extension procedures, so start from procedure 8.b.2.

```
Not exist(new install) [ to Procedure 8.b.3.]
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf: No such file or directory
```

```
Exist(operation with non-active extension procedures) [ to Procedure 8.b.2. ]
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf
```

2. When operating with non-active extension procedures, execute the following commands and confirm that /kernel/drv/hddv.conf is deleted.

```
# hddvadm -i <Return>
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf: No such file or directory
```

3. Use the following command to create hddv.conf file for the pre-defined extension function. The message examples for "operation with non-active extension procedures" means that disk array device GR720 currently used with taget=1(lun=0) is registered twice on the sd/hddv driver.

```
New installation [ to procedure 8.b.5.]
# hddvadm -M <Return>

Operation with non-active extension procedures [ to procedure 8.b.4.]
# hddvadm -M <Return>
already ID= 1 exists. /devices/pci@1d,2000/fibre-channel@1/sd@1,0:a,raw : GR720
```

4. When performing active extension, the same target number cannot be registered in sd.conf and hddv.conf, so delete or comment out the conflicting definition parts in sd.conf file when definition in the two files conflict with each other.
   The following example shows the case that target=1 is repeated

```
# vi /kernel/drv/sd.conf <Return>
:
name="sd" class="scsi"
target=0 lun=0;
:
#name="sd" class="scsi"
target=1 lun=0;
#name="sd" class="scsi" delete or comment out
target=1 lun=1; the duplication definition parts in sd/hddv
#name="sd" class="scsi"
target=1 lun=2;
:
```

   A target number that is already used by the sd driver of the system disk or CD-ROM cannot be deleted. In this case, change the target number in hddv.conf and of the disk array device so that it does not conflict with sd.conf.

5. Edit the /kernel/drv/hddv.conf file created automatically by the hddvadm -M command, and remove comments of the LUN definition to pre-define and the LUN definition currently being used with non-active extension procedures.
   If case active extension has been performed before and the LUN definition to extend the next procedures 1.f. - 1.g. are not needed.
   The following example shows target=3, lun=0~2 for pre-defined extension and disk array device GR720 (target=1) in use with non-active extension procedures being registered.

```
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf
# vi /kernel/drv/hddv.conf <Return>
:
#name="hddv" class="scsi" target=0 lun=0;
:
#name="hddv" class="scsi" target=0 lun=7;
:
name="hddv" class="scsi" target=1 lun=0;
name="hddv" class="scsi" target=1 lun=1; remove comments of the LUN in use
name="hddv" class="scsi" target=1 lun=2;
:
name="hddv" class="scsi" target=3 lun=0;
name="hddv" class="scsi" target=3 lun=1; remove comments of extended LUN
name="hddv" class="scsi" target=3 lun=2;
#name="hddv" class="scsi" target=3 lun=3;
:
```

6. Check the LUN definition overlap between sd.conf and hddv.conf by executing hddvchk_conf command. The message example for "Check NG" means that target=3 is defined in both files, and the procedures must be performed again from procedure 8.b.4.

The followings are examples of execution of the FJSVhddv package installation to /opt. The path of the hddvchk_conf command depends on the installed directory.

```
Check OK [ to procedure 8.b.7.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
/kernel/drv/sd.conf and /kernel/drv/hddv.conf seems to be correct

Check NG [ to procedure 8.b.4]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
NG ID = [ 3 ]
```

7. Execute the following command in order to make the hard disk driver set up the LUN added.

```
# update_drv -f hddv <Return>
```

In case disk array equipment currently used exists, the following messages are displayed but do not effect performance.

```
# update_drv -f hddv <Return>
Cannot unload module: hddv
Will be unloaded upon reboot.
Forcing update of hddv.conf.
```

8. After saving execution result of the prtpicl(1M) command, get the physical path name of added LUN by taking the difference between the result and the information obtained in 3.a, and calculate the corresponding logical path name under /dev/dsk
   In the following example, **"c3t3d0"** is logical path name of added lun=0. The logical path name of lun=1,2 is set to **"c3t3d1"**, **"c3t3d2"** respectively, because cXtYdZmeans X: PCI card number, Y: target number, Z: lun number

```
# prtpicl -v > /tmp/prtpicl.post <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep hddv <Return>
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,0
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,1
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,2
# ls -l /dev/dsk | grep /pci@89,2000/fibre-channel@1/hddv@3,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s0
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:a
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s1
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s2
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s3
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:d
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s4
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:e
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s5
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:f
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s6
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:g
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s7
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:h
```

9. Start the format(1M) command and configure labeling and partition(slice) information calculated in 8.b.8. to the logical path name of each extended LUN.

c. Add configure of PCI card driver

[SCSI driver(Solaris OE: glm , FUJITSU PCI SCSI Adapter Driver)]

No procedure is necessary. Go to step 9.

[Fibre Channel driver (PW008FC3U/PW008FC2U/ GP7B8FC1U)]

No procedure is necessary. Go to step 9.

[Fibre Channel Card (PW028FC4/PW028FC5)]

Bind the auto mapped target connected with the card and modify the entries of lpfc.conf to match the requirements of the extended Fibre Channel Controller. These procedures are reflected on next boot time. In the following, indicate to bind the auto mapped target with the card.

```
# /usr/sbin/lpfc/lputil<Return>
LightPulse Common Utility for Solaris/SPARC. Version 1.6a8 (03/03/2004).
Copyright (c) 2003, Emulex Network Systems, Inc.

Emulex Fibre Channel Host Adapters Detected: 2
Host Adapter 0 (lpfc11) is an LP9802 (Ready Mode)
Host Adapter 1 (lpfc9) is an LP9802 (Ready Mode)
```

```
MAIN MENU
1. List Adapters
2. Adapter Information
3. Firmware Maintenance
4. Reset Adapter
5. Persistent Bindings
0. Exit
Enter choice => 5 <Return>

PERSISTENT BINDINGS MENU
1. Display Current Bindings
2. Display All Nodes
3. Duplicate Adapter Bindings
4. Bind Target Manually
5. Bind Automapped Targets
6. Delete Binding(s)
0. Return to Main Menu
Enter choice => 5 <Return>
0. lpfc11
1. lpfc9
Select an adapter => 0 <Return>

Automapped FCP Nodes:
Node Target WWPN WWNN
---- ------ --------- --------
Automapped FCP Node 0 50-06-0e-80-00-10-04-92 50-06-0e-80-00-10-04-92
Automapped FCP Node 1 50-06-0e-80-00-10-04-90 50-06-0e-80-00-10-04-90

Press the Enter or Return key to continue:
Bind all auto-mapped targets? (Y/N) => Y <Return>

Select Binding Method:
1. By Node Name
2. By Port Name
3. By D_ID

0. Cancel
Enter Choice => 2 <Return>
:
```

9. Setup redundant system
   Execute the following commands to create a new redundant system.
   The following procedure is described for MPHD/GRMPHD. If you use the redundancy software other than MPHD/GRMPHD, see the document for each product.
   In case of MPHD, the commands need to be executed for each LUN, specifying the path name determined in 8.b.8 as a parameter.
   The italic letters below are the new multipath names, and the underlined letters are the path names that compose the multipath.

```
MPHD
# /usr/opt/FJSViomp/bin/iompadm -c mphd new /dev/rdsk/c3t3d0s2 /dev/rdsk/c4t3d0s2
<Return>
IOMP: /dev/FJSVmphd/fiomp/adm2
Node:
/dev/FJSVmphd/rdsk/mphd2s0
/dev/FJSVmphd/rdsk/mphd2s1
/dev/FJSVmphd/rdsk/mphd2s2
/dev/FJSVmphd/rdsk/mphd2s3
/dev/FJSVmphd/rdsk/mphd2s4
/dev/FJSVmphd/rdsk/mphd2s5
/dev/FJSVmphd/rdsk/mphd2s6
/dev/FJSVmphd/rdsk/mphd2s7

GRMPD
# /usr/sbin/mplbconfig -nv <Return>
*** Phase 1: checking /dev/rdsk ***
*** Phase 2: checking multi path ***
*** Phase 3: analyzing path ***
Path : Action : Element path : LUN : Storage : Zone
```

```
mplb0 : exist : c1t4d0s2 c2t3d0s2 : 0 : GR720464f-12340001 :
:
mplb8 : new : c3t3d0s2 c4t3d0s2 : 0 : GR8404550- 000213 :
:
# /usr/sbin/mplbconfig -av <Return>
:
IOMP: /dev/FJSVmplb/fiomp/adm8
Node:
/dev/FJSVmplb/rdsk/mplb8s0
/dev/FJSVmplb/rdsk/mplb8s1
/dev/FJSVmplb/rdsk/mplb8s2
/dev/FJSVmplb/rdsk/mplb8s3
/dev/FJSVmplb/rdsk/mplb8s4
/dev/FJSVmplb/rdsk/mplb8s5
/dev/FJSVmplb/rdsk/mplb8s6
/dev/FJSVmplb/rdsk/mplb8s7
:
```

10. Setup applications
    Add configuration for the application using the logical path name determined in 8.
    [filesystem operation]
    Create file system.
    To mount at system start, add an entry in the /etc/vfstab file.

```
# newfs /dev/FJSVmphd/rdsk/mphd2s6 <Return>
# vi /etc/vfstab <Return>
:
/dev/FJSVmphd/dsk/mphd2s6 /dev/FJSVmphd/rdsk/mphd2s6 /mnt ufs 1 yes -
:
```

    [raw access operation]
    Configure applications.
    For details, see the manual of each application.
    [swap device]
    Add swap device.
    To make valid at system start, add an entry in the /etc/vfstab file.

```
# swap -a /dev/FJSVmphd/dsk/mphd2s4 <Return>
# vi /etc/vfstab <Return>
:
/dev/FJSVmphd/dsk/mphd2s4- - swap - no -
:
# swap -l <Return>
swapfile dev swaplo blocks free
:
/dev/FJSVmphd/dsk/mphd2s4 32,164 16 788384 683680
```

11. Start applications
    Use the logical path name determined in 8. to start applications.
    [filesystem operation]
    Mount filesystem

```
# mount -F ufs /dev/FJSVmphd/dsk/mphd2s6 /mnt <Return>
```

    [raw access operation]
    Start applications.
    For details, see the manual of each application.
    [swap device]
    This procedure is not required.

3.2.2.3 Extension of PCI cards to redundant system

The procedure to add PCI cards to a redundant system in order to extend redundancy on a Solaris 9 OE or later system is explained with an example with GR multipath driver (GRMPD).

There is no additional pattern for Multipath Disk Control (MPHD).

If multipath software products other than GRMPD are being used, see the manual of each product.

No configuration is needed for applications when adding PCI cards to an existing redundant system.

1. Stop the machine administration hardware monitoring daemon
   Use the following command to stop the hardware monitoring daemon of machine administration.

```
# /usr/sbin/FJSVmadm/prephp <Return>
```

2. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
   The daemons will be stopped.

```
# /etc/rc0.d/K10hbanyware stop <Return>
# /etc/rc0.d/K10hbanywareDisc stop <Return>
```

3. Add PCI cards
   Add PCI cards according to the following procedure.
   [for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:
   If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility
   No procedure is necessary. Go to step 4.
   If you don't use SAN management function of the above products
   To add PCI cards with the following configurations, Fibre Channel switch SN200 series and disk array device ETERNUS3000/ETERNUS6000/GR700/800 series need to be reconfigured individually.
   -If zone configuration by WWPN(World Wide Port Name) is done on SN200 series.
   -If the Host Affinity function of ETERNUS3000/ETERNUS6000/GR700/800 series is used.
   For details, see "SN200 Series Affinity User's Guide" or "ETERNUSmgr User Guide/GRmgr User Guide." If you use the Fibre Channel switch or disk array device other than described above, see the document of each product.
   To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the eight characters shown on a label on the front plate of the card. These characters represent the bottom eight digit of the WWPN in hexadecimal form. The top eight digit are fixed to 10000000 in hexadecimal form.
   For example, if the following label is shown on the front plate of the card, the WWPN of the replacement card is 100000000e244061.

```
0e24
4061
```

   [for Fibre Channel Card (PW028FC4/PW028FC5)]:
   To replace PCI cards with the following configurations, Fibre Channel switch and disk array device need to be reconfigured individually.
   -If zone configuration by WWPN (World Wide Port Name) is done on Fibre Channel switch.
   -If the Host Zoning function of disk array device is used.
   For details, see the document of each product.
   To perform the above reconfiguration, the WWPN(a 16-digit number) of the replacement card is needed. The WWPN of the PCI card can be known from the twelve characters shown on a label on the back of the card. These characters represent the bottom twelve digit of the WWPN in hexadecimal form. The top four digit are fixed to 1000 in hexadecimal form.
   For example, if the following label is shown on the back of the card, the WWPN of the replacement card is 10000000c9366037.

```
IEEE:0000c9366037
```

   Note:
   When changing Affinity configuration on SN200 series or other Fibre Channel switch, I/O to other devices is effected by the change, and may result in temporal errors.
   I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.
   a. Before extension of PCI cards, save the current execution result of the prtpicl(1M) command (current configuration at present.)

```
# prtpicl -v > /tmp/prtpicl.pre <Return>
```

   b. Check the status of the slot.
      When adding PCI cards to a redundant configuration, several PCI cards may be added to the system. In this case, perform procedures to 3. on each card.
      The relationship of the position of a PCI card and format of "Ap_Id" is shown below.

Location of PCI slot	Element	Format of "Ap_Id"
Cabinet of PRIMEPOWER 900/1500/2500	Cabinet Number : **X** System Board Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:C**X**M0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** C**X**M0**Y**-PCI#**ZZ**
PCI / Disk Box	I/O Cabinet Number : **X** PCI / Disk Box Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:R**X**B0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** R**X**B0**Y**-PCI#**ZZ**
other than those above	Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:PCI#slot**ZZ** ·**Solaris 10 OE** PCI#**ZZ**

Below, an example of adding a PCI card to chassis number : **0**, PCI/Disk BOX number : **1**, physical slot number : **02**, slot in PCI/Disk BOX(R**0**B0**1**-PCI#slot**02**) is explained.
Check the status of the target slot is "empty unconfigured."

```
# cfgadm | grep R0B01-PCI#slot02 <Return>
pcipsy18:R0B01-PCI#slot02 unknown empty unconfigured unknown
```

c. To confirm the slot position at extension operation, blink the ALARM LED of Ap_Id displayed in procedure 3.b.

```
# cfgadm -x led=fault,mode=blink pcipsy18:R0B01-PCI#slot02 <Return>
```

d. After checking that the READY LED on the PCI slot to add the PCI card is off, add PCI cards and connect cable to devices. This operation is performed by our customer support.

e. Use the cfgadm(1M) command to check that the slot status of the added PCI card changed to "disconnected unconfigured".

```
# cfgadm pcipsy18:R0B01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy18:R0B01-PCI#slot02 unknown disconnected unconfigured unknown
```

4. Connect the PCI card
Connect the replaced PCI card using the cfgadm(1M) command with the configure option, or by pushing the button corresponding to the extension slot position. Note that the push button is only effective in multiuser mode. After the new PCI card is connected, use the cfgadm(1M) command and confirm that the slot status has changed to "connected configured."
If a large-scale configuration of I/O devices is connected to the PCI card in the target slot, command execution for status confirmation may take time.

```
# cfgadm -c configure pcipsy18:R0B01-PCI#slot02 <Return>
# cfgadm pcipsy18:R0B01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy18:R0B01-PCI#slot02 mult/hp connected configured ok
```

5. If you use the Fibre Channel Card (PW028FC4/PW028FC5), execute the following.
The daemons will be started.

```
# /etc/rc2.d/S99hbanyware start <Return>
# /etc/rc2.d/S99hbanywareDisc start <Return>
```

6. Update hardware configuration information of machine administration/ Start the hardware monitoring daemon.
Execute the following commands to update hardware configuration information of machine administration and to restart the hardware monitoring daemon.

```
# /usr/sbin/FJSVmadm/postphp <Return>
```

7. Preparation to recognize devices for Fibre Channel
When the Host Affinity function is being used with Fibre Channel SN200 series, Host Affinity must be configured for the device added.
[for PCI Fibre Channel(PW008FC3U/PW008FC2U/ GP7B8FC1U)]:
If you use SAN management function of Systemwalker StorageMGR/Softek SANView for ETERNUS (except for Vixel) /SP5000 SRM Facility
WWPN zoning of SN200 series, Host affinity of Array disk device ETERNUS3000/ETERNUS6000/GR700/800 series and binding setting for fjpfca.conf/sd.conf of host can be added from SAN management window automatically.
See "Operation guide" or "User's Manual" of each product for details.
Before using this function, the following procedure 8.a.1. and 8.a.2. [except fcp-bind-target setting] are necessary.
Moreover, begin from procedure 8.a.3. after executing this function.
If you don't use SAN management function of the above products
No procedure is necessary. Go to step 8.
[for Fibre Channel Card (PW028FC4/PW028FC5)]:
No procedure is necessary. Go to step 8.
Note:
When changing Affinity configuration on SN200 series, I/O to other devices is effected by the change, and may result in temporal errors.
I/O to disk array devices recovers normally because of retry processes, but on Fibre Channel tape devices, backup processes may end in errors. Stop backup before changing Affinity configuration.

8. Set up driver
Add driver configurations with the operation below.
With file related drivers, configuration for the PCI card driver and the device driver is needed.

a. Add configuration for PCI card driver
[SCSI driver(Solaris OE:glm, FUJITSU PCI SCSI Adapter Driver)]
Configuration is not required.
[Fibre Channel driver (PW008FC3U/PW008FC2U/ GP7B8FC1U)]

1. After saving execution result of prtpicl (1M) command, take the difference between the result and the information obtained in procedure 3.a. to calculate the instance number of the fjpfca driver of the PCI card added.

In the following example, instance number is 1, indicating that the interface name of the PCI card added is fjpfca1.
Making the LED of the PCI card blink using the fc_adm command can specify the relation between the instance number and the slot position. The relation between the WWPN and instance number of the PCI card added can be known from the "fc_info -a" command.

```
# prtpicl -v > /tmp/prtpicl.pfca <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.pfca | more <Return>
:
> :status okay
> :fru PCI slot(PCI#02 at Rack#0,IO_BOX#1)
> :component-name R0B01-PCI#02
> :devfs-path /pci@8d,2000/fibre-channel@1
> :driver-name fjpfca
> :binding-name pci10cf,105c
> :bus-addr 1
> :instance 1
> :_class obp-device
> :name fibre-channel
:
```

2. Edit the /kernel/drv/fjpfca.conf file, and add the following property definitions to the instance number determined in 8.a.1.
   port(type of topology, link speed)
   Defined when adding PCI cards with Fabric connection.
   This definition is not needed with FC-AL connection.
   fcp-bind-target(connection between target ID and WWN)
   Defined when adding disk array with Fabric connection.
   This definition is not needed with FC-AL connection.
   max-throttle(maximum issued SCSI commands)
   Defined to limit the number of SCSI commands issued at the same time.
   The need and value of this definition depends on the disk array device, so refer to the manuals of each disk array device.
   Below is an example where definitions for a PCI card at fjpfca1(instance number 1) and a disk array device at target=3 is added.

```
# vi /kernel/drv/fjpfca.conf <Return>
:
port=
"fjpfca0:nport",
"fjpfca1:nport:sp1"; <- add

fcp-bind-target=
"fjpfca0t0:0x50000e1000002501",
"fjpfca1t3:0x50000e1000002ab0"; <- add

max-throttle=
"fjpfca0t0:128",
"fjpfca1t3:240"; <- add
```

3. Execute the following command to make the fjpfca driver set up the additional part.

```
# /usr/sbin/FJSVpfca/fc_config -v <Return>
```

   [Fibre Channel driver (PW028FC4/PW028FC5)]
   Configuration is not required.
   Compare the output of prtpicl(1M) command with the output saved at 3.b and find the instance number of the added card.

b. Add configuration of device driver
   [Disk/Tape devices(Solaris OE : sd/st)]
   This example is a case where a disk device of target=2, lun=0 is pre-defined in procedure 1. and added in procedure 4. If the device is a tape device, re-read "sd" as "st" in this procedure and perform the same operation.

1. Execute the following command to make the sd driver set up the added disk device.

```
# /usr/sbin/devfsadm <Return>
```

2. After saving the execution result of the prtpicl(1M) command, take the difference between the result and the information obtained in 3.a. and get the physical path name of additional disk device, then get the logical path name under /dev/dsk.
   In the following example, **"c3t3d0"**,**"c4t3d0"** is the logical path name of the disk device added.

```
# prtpicl -v > /tmp/prtpicl.post <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep hddv <Return>
```

```
> :devfs-path /pci@8d,2000/fibre-channel@1/sd@3,0
> :devfs-path /pci@8d,2000/fibre-channel@1/sd@3,1
> :devfs-path /pci@8d,2000/fibre-channel@1/sd@3,2
> :devfs-path /pci@89,2000/fibre-channel@1/sd@3,0
> :devfs-path /pci@89,2000/fibre-channel@1/sd@3,1
> :devfs-path /pci@89,2000/fibre-channel@1/sd@3,2
# ls -l /dev/dsk | grep /pci@8d,2000/fibre-channel@1/sd@3,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s0
-> ../../devices/pci@8d,2000/fibre-channel@1/sd@3,0:a
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s1
-> ../../devices/pci@8d,2000/fibre-channel@1/sd@3,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s2
-> ../../devices/pci@8d,2000/fibre-channel@1/sd@3,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s3
-> ../../devices/pci@8d,2000/fibre-channel@1/sd@3,0:d
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s4
-> ../../devices/pci@8d,2000/fibre-channel@1/sd@3,0:e
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s5
-> ../../devices/pci@8d,2000/fibre-channel@1/sd@3,0:f
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s6
-> ../../devices/pci@8d,2000/fibre-channel@1/sd@3,0:g
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s7
-> ../../devices/pci@8d,2000/fibre-channel@1/sd@3,0:h
# ls -l /dev/dsk | grep /pci@89,2000/fibre-channel@1/sd@3,0 <Return>
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c4t3d0s0
-> ../../devices/pci@89,2000/fibre-channel@1/sd@3,0:a
```

[Disk array device (hard disk driver : hddv)]

This example is a case where a disk array device of target=3, lun=0-2 is pre-defined in procedure 1. and added in procedure 4.

1. Check if /kernel/drv/hddv.conf exists.
   Check if /kernel/drv/hddv.conf exists. If it exists, the hard disk driver is being installed, so start from procedure 8.b.3. If it does not exist, the system is being operated with none-active extension procedures, so start from procedure 8.b.2.

```
Not exist(new install) [ to procedure 8.b.3.]
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf: No such file or directory

Exist(operation with non-active extension procedures) [ to procedure 8.b.2.]
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf
```

2. When operating with non-active extension procedures, execute the following commands and confirm that /kernel/drv/hddv.conf is deleted.

```
# hddvadm -i <Return>
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf: No such file or directory
```

3. Use the following command to create hddv.conf file for the pre-defined extension function. The message examples for "operation with non-active extension procedures" means that disk array device GR720 currently used with taget=1(lun=0) is registered twice on the sd/hddv driver.

```
New installation [ to procedure 8.b.5.]
# hddvadm -M <Return>

Set up with a non-active extension procedure [ to procedure 8.b.4.]
# hddvadm -M <Return>
already ID= 1 exists. /devices/pci@1d,2000/fibre-channel@1/sd@1,0:a,raw : GR720
```

4. In activity extension, because same target number can't be registered in sd.conf and hddv.conf, delete or comment out the duplication definition parts in sd.conf file when both definition are overlapped. The following example shows the case that target=1 is repeated.

```
# vi /kernel/drv/sd.conf <Return>
:
name="sd" class="scsi"
target=0 lun=0;
:
#name="sd" class="scsi"
target=1 lun=0;
```

```
#name="sd" class="scsi" delete or comment out
target=1 lun=1; the duplication definition parts in sd/hddv
#name="sd" class="scsi"
target=1 lun=2;
:
```

A target number that is already used by the sd driver of the system disk or CD-ROM cannot be deleted. In this case, change the target number in hddv.conf and of the disk array device so that it does not conflict with sd.conf.

5. Edit the /kernel/drv/hddv.conf file created automatically by the hddvadm -M command, and remove comments of the LUN definition to pre-define and the LUN definition currently being used with non-active extension procedures.
   If case active extension has been performed before and the LUN definition to extend the next procedures 1.f. - 1.g. are not needed.
   The following example shows target=3 , lun=0~2 for pre-defined extension and disk array device GR720 (target=1) in use with non-active extension procedures being registered.

```
# ls /kernel/drv/hddv.conf <Return>
/kernel/drv/hddv.conf
# vi /kernel/drv/hddv.conf <Return>
:
#name="hddv" class="scsi" target=0 lun=0;
:
#name="hddv" class="scsi" target=0 lun=7;
:
name="hddv" class="scsi" target=1 lun=0;
name="hddv" class="scsi" target=1 lun=1; remove comments of the LUN in use
name="hddv" class="scsi" target=1 lun=2;
:
name="hddv" class="scsi" target=3 lun=0;
name="hddv" class="scsi" target=3 lun=1; remove comments of extended LUN
name="hddv" class="scsi" target=3 lun=2;
#name="hddv" class="scsi" target=3 lun=3;
:
```

6. Check the LUN definition overlap between sd.conf and hddv.conf by executing hddvchk_conf command. The message example for "Check NG" means that target=3 is defined in both files, and the procedures must be performed again from procedure 8.b.4.
   The followings are examples of execution of the FJSVhddv package installation to /opt. The path of the hddvchk_conf command depends on the installed directory.

```
Check OK [ to procedure 8.b.7.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
/kernel/drv/sd.conf and /kernel/drv/hddv.conf seems to be correct

Check NG [ to procedure 8.b.4.]
# /opt/FJSVhddv/bin/hddvchk_conf <Return>
NG ID = [ 3 ]
```

7. Execute the following command in order to make the hard disk driver set up the LUN added.

```
# update_drv -f hddv <Return>
```

In case disk array equipment currently used exists, the following messages are displayed but do not effect performance.

```
# update_drv -f hddv <Return>
Cannot unload module: hddv
Will be unloaded upon reboot.
Forcing update of hddv.conf.
```

8. After saving execution result of the prtpicl(1M) command, get the physical path name of added LUN by taking the difference between the result and the information obtained in 3.a, and calculate the corresponding logical path name under /dev/dsk.
   In the following example, **"c3t3d0"** is logical path name of added lun=0. The logical path name of lun=1,2 is set to **"c3t3d1"**, **"c3t3d2"** respectively, because c**X**t**Y**d**Z**means **X**: PCI card number, **Y**: target number, **Z**: lun number

```
# prtpicl -v > /tmp/prtpicl.post <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | grep devfs-path | grep hddv <Return>
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,0
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,1
> :devfs-path /pci@89,2000/fibre-channel@1/hddv@3,2
# ls -l /dev/dsk | grep /pci@89,2000/fibre-channel@1/hddv@3,0 <Return>
```

```
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:a
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s1
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:b
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s2
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:c
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s3
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:d
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s4
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:e
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s5
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:f
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s6
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:g
lrwxrwxrwx 1 root root 41 Sep 20 22:53 c3t3d0s7
-> ../../devices/pci@89,2000/fibre-channel@1/hddv@3,0:h
```

9. Start format command and configure labeling and partition (slice) information calculated at 8.b.8 to the logical path name of each extended LUN.

c. Add configure of PCI card driver

[SCSI driver(Solaris OE: glm , FUJITSU PCI SCSI Adapter Driver)]

No procedure is necessary. Go to step 9.

[Fibre Channel driver (PW008FC3U/PW008FC2U/ GP7B8FC1U)]

No procedure is necessary. Go to step 9.

[Fibre Channel Card (PW028FC4/PW028FC5)]

Bind the auto mapped target connected with the card and modify the entries of lpfc.conf to match the requirements of the extended Fibre Channel Controller. These procedures are reflected on next boot time. In the following, indicate to bind the auto mapped target with the card.

```
# /usr/sbin/lpfc/lputil<Return>
LightPulse Common Utility for Solaris/SPARC. Version 1.6a8 (03/03/2004).
Copyright (c) 2003, Emulex Network Systems, Inc.

Emulex Fibre Channel Host Adapters Detected: 2
Host Adapter 0 (lpfc11) is an LP9802 (Ready Mode)
Host Adapter 1 (lpfc9) is an LP9802 (Ready Mode)

MAIN MENU
1. List Adapters
2. Adapter Information
3. Firmware Maintenance
4. Reset Adapter
5. Persistent Bindings
0. Exit
Enter choice => 5 <Return>

PERSISTENT BINDINGS MENU
1. Display Current Bindings
2. Display All Nodes
3. Duplicate Adapter Bindings
4. Bind Target Manually
5. Bind Automapped Targets
6. Delete Binding(s)
0. Return to Main Menu
Enter choice => 5 <Return>
0. lpfc11
1. lpfc9
Select an adapter => 0 <Return>

Automapped FCP Nodes:
Node Target WWPN WWNN
---- ------ --------- --------
Automapped FCP Node 0 50-06-0e-80-00-10-04-92 50-06-0e-80-00-10-04-92
Automapped FCP Node 1 50-06-0e-80-00-10-04-90 50-06-0e-80-00-10-04-90
Press the Enter or Return key to continue:
Bind all auto-mapped targets? (Y/N) => Y <Return>
Select Binding Method:
1. By Node Name
2. By Port Name
```

```
3. By D_ID
0. Cancel
Enter Choice => 2 <Return>
:
```

9. Connect to redundant system
   The following procedure is described for MPHD/GRMPHD. If you use the redundancy software other than MPHD/GRMPHD, see the document for each product.
   To connect the added PCI card to the redundant system, execute the following command and confirm that the path name determined in procedure 8.b.8 (in underlined letters) is added.

```
# /usr/sbin/mplbconfig -nv <Return>
*** Phase 1: checking /dev/rdsk ***
*** Phase 2: checking multi path ***
*** Phase 3: analyzing path ***
Path : Action : Element path : LUN : Storage : Zone
mplb0 : exist : c1t4d0s2 c2t3d0s2 : 0 : GR720464f-12340001 :
:
mplb8 : add : c3t3d0s2 c4t3d0s2 c5t3d0s2: 0 : GR8404550- 000213 :
:
# /usr/sbin/mplbconfig -av <Return>
:
IOMP: /dev/FJSVmplb/fiomp/adm8
Node:
/dev/FJSVmplb/rdsk/mplb8s0
/dev/FJSVmplb/rdsk/mplb8s1
/dev/FJSVmplb/rdsk/mplb8s2
/dev/FJSVmplb/rdsk/mplb8s3
/dev/FJSVmplb/rdsk/mplb8s4
/dev/FJSVmplb/rdsk/mplb8s5
/dev/FJSVmplb/rdsk/mplb8s6
/dev/FJSVmplb/rdsk/mplb8s7
:
```

Chapter 4 Network Devices

This chapter describes the detailed procedure about replacement or extension of network-related PCI cards by PCI Hot Plug.

Please refer to manuals of each software about the details of the redundant software.

4.1 Replacement of PCI card

This section describes replacement procedure of the PCI card by using PCI Hot Plug on non-redundant system and redundant system.

4.1.1 Replacement of PCI cards on non-redundant system

When exchanging PCI cards without redundant configuration software, you must stop applications which using PCI cards. The replacement procedure of PCI cards is as follows.

1. Stop the hardware monitoring of the Machine Administration
   The hardware monitoring of the Machine Administration is stopped by using the following command.
   Please refer to "PCI Hot Plug User's Guide" about the details of prephp (1M) command.

   # /usr/sbin/FJSVmadm/prephp <Return>

2. Specify the replacing PCI card
   The interfaces (e.g. hme1) which stop applications for replacement of PCI cards are specified from warning messages outputted the console.
3. Stop applications
   By following operations, the high layer product (e.g. service, application) which uses PCI cards for exchange is stopped.
   a. When using TCP/IP interface
      The example in the case of using TCP/IP interface is shown below. Please refer to the online manual etc. about the details of the ifconfig (1M) command.
      Moreover, when high layer programs which using the TCP/IP interface needs to be stopped, please stop each high layer program. Please refer to each manual about the stop procedure of high layer programs.
      1. When using Ethernet devices

         # /usr/sbin/ifconfig hme1 down <Return>
         # /usr/sbin/ifconfig hme1 unplumb <Return>

      2. When using ATM devices

         # /opt/FJSVatm/bin/atmunlink *adapter_number* <Return>

   b. When using FNA/SNA communication protocol over Ethernet
      When not using the redundant configuration software, it is necessary to stop all high layer applications that are using Netcompo FNA-LAN, and all interfaces of Netcompo FNA-LAN.
      For details, please refer to the manual of Netcompo FNA-LAN and high layer applications.
4. Disconnect the PCI card
   a. The "Ap_Id" is displayed using the following command, based on the interface (e.g.: hme1) specified in Procedure "2. Specify the replacing PCI card." The attachment pint identifier "Ap_Id" is a value for the cfgadm (1M) command specifying the slot position of the PCI card. Please refer to "PCI Hot Plug user's guide" about the details of cfgadm (1M) and "Ap_Id."

      # **/usr/sbin/FJSVmadm/inst2comp hme1** <Return>
      pcipsy3:COM00-PCI#slot02

   b. Obtained "Ap_Id" is specified as an argument of the cfgadm (1M) command, and it confirms that the slot status of the PCI card that disconnects is "connected configured."

      # **cfgadm pcipsy3:COM00-PCI#slot02** <Return>
      Ap_Id Type Receptacle Occupant Condition
      pcipsy3:COM00-PCI#slot02 pci-pci/hp connected configured ok

   c. Please disconnect the PCI card by executing the cfgadn (1M) command with "Ap_Id," and confirm that the slot status is "disconnected unconfigured."

      # **cfgadm -c disconnect pcipsy3:COM00-PCI#slot02** <Return>
      # **cfgadm pcipsy3:COM00-PCI#slot02** <Return>
      Ap_Id Type Receptacle Occupant Condition
      pcipsy3:COM00-PCI#slot02 pci-pci/hp disconnected unconfigured unknown

   d. To confirm the slot position at replacement operation, blink the ALARM LED of Ap_Id displayed in procedure 4.a.

      # cfgadm -x led=fault,mode=blink pcipsy3:COM00-PCI#slot02 <Return>

5. Replace the PCI card
   The PCI card disconnected in procedure "4. Disconnect the PCI card" is exchanged for a new PCI card. Our customer

service works about this procedure.

6. Connect the PCI card
   The cfgadm command is executed with the "configure" option to "Ap_Id," or the push button of the PCI bus slot is pushed. Then a new PCI card is connected.
   In addition, a push button is valid only in multiple user mode.
   Please confirm that the slot status is "connected configured" by using the cfgadm (1M) command after the above-mentioned procedure.
   Notes:
   If the setup of driver.conf(4) file exist, please refer to "5.1.1 Network driver configuration changing."

   ```
   # cfgadm -c configure pcipsy3:COM00-PCI#slot02 <Return>
   # cfgadm pcipsy3:COM00-PCI#slot02 <Return>
   Ap_Id Type Receptacle Occupant Condition
   pcipsy3:COM00-PCI#slot02 pci-pci/hp connected configured ok
   ```

7. Start applications
   Please restart the stopped high layer product (service, application) by the following operations.
   a. When using TCP/IP interface
      The example in the case of using TCP/IP interface is shown below.
      Furthermore, when the high layer program which is using the PCI card needs to restart, please refer to the manual of each high layer program.
      1. When using Ethernet devices

         ```
         # /usr/sbin/ifconfig hme1 plumb <Return>
         # /usr/sbin/ifconfig hme1 inet 192.168.10.10 netmask + broadcast +
         -trailers up <Return>
         ```

      2. When using ATM devices

         ```
         # /opt/FJSVatm/bin/atmlink adapter_number <Return>
         ```

   b. When using FNA/SNA communication protocol over Ethernet
      When not using the redundant configuration software, it is necessary to start all interfaces of Netcompo FNA-LAN, and all high layer applications that are using Netcompo FNA-LAN.
      For details, please refer to the manual of Netcompo FNA-LAN and high layer applications.

8. Start the hardware monitoring of the Machine Administration
   Please execute the following commands in order to update configuration information, and restart the hardware monitoring of the Machine Administration.
   Please refer to "PCI Hot Plug User's Guide" about details of postphp (1M) command.

   ```
   # /usr/sbin/FJSVmadm/postphp <Return>
   ```

4.1.2 Replacement of PCI cards on redundant system

When exchanging PCI cards with redundant configuration software, it can exchange PCI cards without stopping applications.

This subsection describes replacement procedure of PCI cards with the following redundant configuration software.

- SynfinityLink 2.2
- PRIMECLUSTER GLS 4.0 or later

The replacement and extension of PCI cards are supported only on Redundant Line Control Function of SynfinityLink.

Notes:
Because of the dynamic replacement, if the environment of SynfinityLink or PRIMECLUSTER GLS has been modified, system reboot is not required.

When using other redundant software, please refer to manuals of each product.

1. Stop the hardware monitoring of the Machine Administration
   The hardware monitoring of the Machine Administration is stopped by using the following command.

   ```
   # /usr/sbin/FJSVmadm/prephp <Return>
   ```

2. Specify the replacing PCI card
   The interfaces (e.g. hme1) which stop applications for replacement of PCI cards are specified from warning messages outputted the console.
3. Disconnect from redundant system
   In order to disconnect the PCI card for exchange from a redundant system, please execute the following command with the interface name specified by procedure "2. Specify the replacing PCI card."
   On the redundant system of standby mode, when an online communication path is disconnected, a standby communication path will be online communication path automatically.
   When using the GS/SURE linkage mode in Redundant Line Control Function of SynfinityLink or PRIMECLUSTER GLS, it is necessary to deactivate virtual interfaces (e.g. sha0) used by GS/SURE linkage mode.

   ```
   Fast switching mode in Redundant Line Control Function
   # /opt/FJSVhanet/usr/sbin/hanetnic delete -n sha0 -i hme1 <Return>
   ```

```
# /usr/sbin/ifconfig hme1 unplumb <Return>

NIC switching mode in Redundant Line Control Function
# /opt/FJSVhanet/usr/sbin/hanetpoll off <Return>
# /opt/FJSVhanet/usr/sbin/stpptl -n sha1 <Return>
# /opt/FJSVhanet/usr/sbin/hanetnic change -n sha0 <Return>

GS/SURE linkage mode in Redundant Line Control Function
# /opt/FJSVhanet/usr/sbin/stphanet -n sha0 <Return>

Multipath Function
# /usr/opt/FJSViomp/bin/iompadm -c mpnet stop mpnet0 hme1 <Return>
# /usr/opt/FJSViomp/bin/iompadm -c mpnet disconnect mpnet0 hme1 <Return>
```

4. Disconnect the PCI card
   a. Please specify the PCI bus slot position by the interface (e.g. hme1) in procedure "2. Specify the replacing PCI card."

```
# /usr/sbin/FJSVmadm/inst2comp hme1 <Return>
pcipsy21:R0B01-PCI#slot03
```

   b. Obtained "Ap_Id" is specified as an argument of the cfgadm (1M) command, and it confirms that the slot status of the PCI card that disconnects is "connected configured."

```
# cfgadm pcipsy21:R0B01-PCI#slot03 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy21:R0B01-PCI#slot03 pci-pci/hp connected configured ok
```

   c. Please disconnect the PCI card by executing the cfgadn (1M) command with "Ap_Id," and confirm that the slot status is "disconnected unconfigured."

```
# cfgadm -c disconnect pcipsy21:R0B01-PCI#slot03 <Return>
# cfgadm pcipsy21:R0B01-PCI#slot03 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy21:R0B01-PCI#slot03 pci-pci/hp disconnected unconfigured unknown
```

   d. To confirm the slot position at replacement operation, blink the ALARM LED of Ap_Id displayed in procedure 4.a.

```
# cfgadm -x led=fault,mode=blink pcipsy21:R0B01-PCI#slot03 <Return>
```

5. Replace the PCI card
   The PCI card disconnected in procedure "4. Disconnect the PCI card" is exchanged for a new PCI card. Out customer support works about this procedure.
   Notes:
   When using the PRIMECLUSTER GLS Multipath Function, please exchange the PCI card after waiting 10 seconds or more, after Procedure "4. Disconnect the PCI card."
6. Connect the PCI card
   The cfgadm command is executed with the "configure" option to "Ap_Id," or the push button of the PCI bus slot is pushed. Then a new PCI card is connected.
   In addition, a push button is valid only in multiple user mode.
   Please confirm that the slot status is "connected configured" by using the cfgadm (1M) command after the above-mentioned procedure.
   Notes:
   If the setup of driver.conf(4) file exist, please refer to "5.1.1 Network driver configuration changing."

```
# cfgadm -c configure pcipsy21:R0B01-PCI#slot03 <Return>
# cfgadm pcipsy21:R0B01-PCI#slot03 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy21:R0B01-PCI#slot03 pci-pci/hp connected configured ok
```

7. Connect to redundant system
   In order to connect the exchanged PCI card into a redundant system, please execute the following command with interface name specified at procedure "2. Specify the replacing PCI card."

```
Fast switching mode in Redundant Line Control Function
# /usr/sbin/ifconfig hme1 plumb <Return>
# /usr/sbin/ifconfig hme1 IP_address netmask + broadcast + -trailers up <Return>
# /opt/FJSVhanet/usr/sbin/hanetnic add -n sha0 -i hme1 <Return>

NIC switching mode in Redundant Line Control Function
# /opt/FJSVhanet/usr/sbin/hanetnic change -n sha0 <Return>
# /opt/FJSVhanet/usr/sbin/strptl -n sha1 <Return>

GS/SURE linkage mode in Redundant Line Control Function
```

```
# /opt/FJSVhanet/usr/sbin/strhanet -n sha0 <Return>
# /opt/FJSVhanet/usr/sbin/hanetpoll on <Return>

Multipath Function
# /usr/opt/FJSViomp/bin/iompadm -c mpnet connect mpnet0 hme1 <Return>
# /usr/opt/FJSViomp/bin/iompadm -c mpnet start mpnet0 hme1 <Return>
```

Notes
It is necessary to configure the IP address specified by ifconfig(1M) command in /etc/inet/hosts and /etc/hostname.hme1. Unless these are configured, the virtual interface for fast switching mode can not be activated after rebooting the system. In addition, in order to use IPv6 address, please refer to the PRIMECLUSTER GLS (4.1A20 or later) manual.

8. Switch back the redundant path
   Please switch back an online communication path if needed.
9. Start the hardware monitoring of the Machine Administration
   Please execute the following commands in order to update configuration information, and restart the hardware monitoring of the Machine Administration.

```
# /usr/sbin/FJSVmadm/postphp <Return>
```

4.2 Extension of PCI cards

This section describes extension procedure of the PCI card by using PCI Hot Plug on non-redundant system and redundant system.

4.2.1 Extension of PCI cards on non-redundant system

This subsection describes extension procedure of PCI cards without the redundant configuration software.

1. Stop the hardware monitoring of the Machine Administration
   The hardware monitoring of the Machine Administration is stopped by using the following command.

```
# /usr/sbin/FJSVmadm/prephp <Return>
```

2. Add PCI cards
   a. Before extending the PCI card, please save the result (current configuration information) of the prtpicl (1M) command.

```
# prtpicl -v > /tmp/prtpicl.pre <Return>
```

   b. Check the status of the slot.
   Subsequent examples describe extension of PCI cards to the slot "C0M01-PCI#slot02." The "C0M01-PCI#slot02" indicates the cabinet number : 0, the system board number : 1, physical slot number : 02.
   The relationship of the position of a PCI card and format of "Ap_Id" is shown below. (N: an integral number)

Location of PCI slot	Element	Format of "Ap_Id"
Cabinet of PRIMEPOWER 900/1500/2500	Cabinet Number : **X** System Board Number : **Y** Physical Slot Number : **ZZ**	・**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:C**X**M0**Y**-PCI#slot**ZZ** ・**Solaris 10 OE** C**X**M0**Y**-PCI#**ZZ**
PCI / Disk Box	I/O Cabinet Number : **X** PCI / Disk Box Number : **Y** Physical Slot Number : **ZZ**	・**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:R**X**B0**Y**-PCI#slot**ZZ** ・**Solaris 10 OE** R**X**B0**Y**-PCI#**ZZ**
other than those above	Physical Slot Number : **ZZ**	・**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:PCI#slot**ZZ** ・**Solaris 10 OE** PCI#**ZZ**

   Please confirm that the PCI slot status which extended PCI cards is "empty unconfigured" by using cfgadm (1M) command.

```
# cfgadm | grep C0M01-PCI#slot02 <Return>
pcicsy15:C0M01-PCI#slot02 unknown empty unconfigured unknown
```

   c. To confirm the slot position at extension operation, blink the ALARM LED of Ap_Id displayed in procedure 2.b.

```
# cfgadm -x led=fault,mode=blink pcipsy15:C0M01-PCI#slot02 <Return>
```

   d. Please confirm that READY LED of the PCI bus slot that extends a PCI card has gone out, and extend a PCI card. This operation is performed by our customer support.
   e. Please confirm that the PCI slot status which extended PCI cards is "disconnected unconfigured" by using cfgadm (1M) command.

```
# cfgadm pcipsy15:C0M01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcicsy15:C0M01-PCI#slot02 unknown disconnected unconfigured unknown
```

3. Connect PCI cards
   The cfgadm command is executed with the "configure" option to "Ap_Id," or the push button of the PCI bus slot is pushed. Then extended PCI card is connected.
   In addition, a push button is valid only in multiple user mode.
   Please confirm that the slot status is "connected configured" by using the cfgadm (1M) command after the above-mentioned procedure.

```
# cfgadm -c configure pcipsy15:C0M01-PCI#slot02 <Return>
# cfgadm pcipsy15:C0M01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy15:C0M01-PCI#slot02 pci-pci/hp connected configured ok
```

4. Start the hardware monitoring of the Machine Administration
   Please execute the following commands in order to update configuration information, and restart the hardware monitoring of the Machine Administration.

```
# usr/sbin/FJSVmadm/postphp <Return>
```

5. Connect equipment to PCI cards
   The extended PCI card is connected with network equipment by the cable.
6. Setup driver
   The driver configuration is added by following operations.
   a. The interface name is investigated in order to configure drivers and high layer products.
      Please save the result of the prtcicl (1M) command, and obtain the difference information between current result and the result taken at "2.a." Then, the driver instance number for the extended PCI card is obtained.
      In the following example, since the instance number is 1, it can be determined that the interface name of the extended PCI card is "hme1."

```
# prtpicl -v > /tmp/prtpic.post <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | more <Return>
:
> :status okay
> :devfs-path /pci@8d,2000/network@1
> :driver-name hme
> :binding-name SUNW,hme
> :bus-addr 1
> :instance 1
> :_class obp-device
> :name network
:
```

   b. It confirms that the interface name that obtained above-mentioned procedure is an interface name that corresponds to the PCI bus slot of the added PCI card.
      Please carry out this procedure, when it cannot identify relationship between an interface name and PCI bus slot by expanding two or more PCI cards especially.

```
# /usr/sbin/FJSVmadm/inst2comp hme1 <Return>
pcipsy15:C0M01-PCI#slot02
```

   c. The configuration of each driver is added.
      Please refer to each driver manual for details.
7. Setup applications
   The configuration of extended PCI card used by high layer products (services, applications) is added.
   Please refer to each high layer product manual for details.
8. Start applications
   By the following operations, please start the high layer product (service, application) used by the extended PCI card.
   a. When using TCP/IP interface
      The example in the case of using TCP/IP interface is shown below.
      Furthermore, when the high layer program which is using the PCI card needs to restart, please refer to the manual of each high layer program.

```
# /usr/sbin/ifconfig hme1 plumb <Return>
# /usr/sbin/ifconfig hme1 inet 192.168.10.10 netmask + broadcast + -trailers up
<Return>
```

   b. When using FNA/SNA communication protocol over Ethernet
      When not using the redundant configuration software, it is necessary to start all interfaces of Netcompo FNA-LAN, and all high layer applications that are using Netcompo FNA-LAN.
      For details, please refer to the manual of Netcompo FNA-LAN and high layer applications.

4.2.2 Extension of PCI cards with new redundant system

This subsection describes extension procedure of a new redundant system with the following redundant configuration software.

- SynfinityLink 2.2

· PRIMECLUSTER GLS 4.0 or later

The replacement and extension of PCI cards are supported only on Redundant Line Control Function of SynfinityLink.

Notes:
Because of the dynamic exteinsion, if the environment of SynfinityLink or PRIMECLUSTER GLS was newly added, system reboot is not required.

When using other redundant software, please refer to manuals of each product.

1. Stop the hardware monitoring of the Machine Administration
   The hardware monitoring of the Machine Administration is stopped by using the following command.

   ```
   # /usr/sbin/FJSVmadm/prephp <Return>
   ```

2. Add PCI cards
   a. Before extending the PCI card, please save the result (current configuration information) of the prtpicl (1M) command.

      ```
      # prtpicl -v > /tmp/prtpicl.pre <Return>
      ```

   b. Check the status of the slot.
      Subsequent examples describe extension of PCI cards to the slot "R0B01-PCI#slot02." The "R0B01-PCI#slot02" indicates the I/O cabinet number : 0, the PCI / Disk Box number : 1, physical slot number : 02.
      In the extension of a new redundant system, although two or more PCI cards are extended, whenever you add a PCI card, please perform from procedure "2.b" to "3. Connect PCI cards."
      The relationship of the position of a PCI card and format of "Ap_Id" is shown below. (N: an integral number)

Location of PCI slot	Element	Format of "Ap_Id"
Cabinet of PRIMEPOWER 900/1500/2500	Cabinet Number : **X** System Board Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:C**X**M0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** C**X**M0**Y**-PCI#**ZZ**
PCI / Disk Box	I/O Cabinet Number : **X** PCI / Disk Box Number : **Y** Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:R**X**B0**Y**-PCI#slot**ZZ** ·**Solaris 10 OE** R**X**B0**Y**-PCI#**ZZ**
other than those above	Physical Slot Number : **ZZ**	·**Solaris 8 OE and Solaris 9 OE** pcipsy**N**:PCI#slot**ZZ** ·**Solaris 10 OE** PCI#**ZZ**

      Please confirm that the PCI slot status which extended PCI cards is "empty unconfigured" by using cfgadm (1M) command.

      ```
      # cfgadm | grep R0B01-PCI#slot02 <Return>
      pcicsy18:R0B01-PCI#slot02 unknown empty unconfigured unknown
      ```

   c. To confirm the slot position at extension operation, blink the ALARM LED of Ap_Id displayed in procedure 2.b.

      ```
      # cfgadm -x led=fault,mode=blink pcipsy18:R0B01-PCI#slot02 <Return>
      ```

   d. Please confirm that READY LED of the PCI bus slot that extends a PCI card has gone out, and extend a PCI card. This operation is performed by our customer support.
   e. Please confirm that the PCI slot status which extended PCI cards is "disconnected unconfigured" by using cfgadm (1M) command.

      ```
      # cfgadm pcipsy15:R0B01-PCI#slot02 <Return>
      Ap_Id Type Receptacle Occupant Condition
      pcicsy18:R0B01-PCI#slot02 unknown disconnected unconfigured unknown
      ```

3. Connect PCI cards
   The cfgadm command is executed with the "configure" option to "Ap_Id," or the push button of the PCI bus slot is pushed. Then a extended PCI card is connected.
   In addition, a push button is valid only in multiple user mode.
   Please confirm that the slot status is "connected configured" by using the cfgadm (1M) command after the above-mentioned procedure.

   ```
   # cfgadm -c configure pcipsy18:R0B01-PCI#slot02 <Return>
   # cfgadm pcipsy18:R0B01-PCI#slot02 <Return>
   Ap_Id Type Receptacle Occupant Condition
   pcipsy18:R0B01-PCI#slot02 pci-pci/hp connected configured ok
   ```

4. Start the hardware monitoring of the Machine Administration
   Please execute the following command in order to update configuration information, and restart the hardware monitoring of the Machine Administration.

   ```
   # /usr/sbin/FJSVmadm/postphp <Return>
   ```

5. Connect equipment to PCI cards
   The extended PCI card is connected with network equipment by the cable.
6. Setup driver
   The driver configuration is added by following operations.
   a. The interface name is investigated in order to configure drivers and high layer products.
      Please save the result of the prtcicl (1M) command, and obtain the difference information between current result and the result taken at "2.a." Then, the driver instance number for the extended PCI card is obtained.
      In the following example, since the instance number is 1, it can be determined that the interface name of the extended PCI card is "hme1."

```
# prtpicl -v > /tmp/prtpic.post <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | more <Return>
:
> :status okay
> :devfs-path /pci@8d,2000/network@1
> :driver-name hme
> :binding-name SUNW,hme
> :bus-addr 1
> :instance 1
> :_class obp-device
> :name network
:
```

   b. It confirms that the interface name that obtained above-mentioned procedure is an interface name that corresponds to the PCI bus slot of the added PCI card.
      Please carry out this procedure, when it cannot identify relationship between an interface name and PCI bus slot by expanding two or more PCI cards especially.

```
# /usr/sbin/FJSVmadm/inst2comp hme1 <Return>
pcicsy18:R0B01-PCI#slot02
```

   c. The configuration of each driver is added.
      Please refer to each driver manual for details.
7. Setup redundant system
   When establishing the redundant configuration system, it is necessary to configure the environmental configuration of the Redundant Line Control Function or the Multipath Function, and to activate the redundant configuration system.
   For details of environmental configuration and activation, please refer to each function manual of SynfinityLink or PRIMECLUSTER GLS.
8. Setup applications
   The configuration of high layer product (services, applications) is added.
   Please refer to the manual of each high layer product for details.
9. Start applications
   By following operations, please start the high layer product.
   a. When using TCP/IP interface
      The high layer product (services, applications) using the TCP/IP interface is started.
      For details of starting the high layer products, please refer to the manual of each product.
   b. When using FNA/SNA communication protocol over Ethernet
      It is necessary to start all interfaces of Netcompo FNA-LAN, and all high layer applications that are using Netcompo FNA-LAN. When using the Multipath Function, the FNA (Fujitsu Network Architecture) /SNA (System Network Architecture) communication protocol over Ethernet is valid.
      For details, please refer to the manual of Netcompo FNA-LAN and high layer applications.

4.2.3 Extension of PCI cards to redundant system

This subsection describes the procedure extending PCI cards to the existing redundant configuration system with the following redundant configuration software.

- SynfinityLink 2.2
- PRIMECLUSTER GLS 4.0 or later

The replacement and extension of PCI cards are supported only on Redundant Line Control Function of SynfinityLink.

Notes:
Because of the dynamic extension, if the environment of SynfinityLink or PRIMECLUSTER GLS has been modified, system reboot is not required.

When using other redundant software, please refer to manuals of each product.

Moreover, when extending PCI cards to the existing redundant configuration system, it is unnecessary to operate about the high layer products. Consequently, PCI cards can be extended without stopping the high layer products.

1. Stop the hardware monitoring of the Machine Administration
   The hardware monitoring of the Machine Administration is stopped by using the following command.

```
# /usr/sbin/FJSVmadm/prephp <Return>
```

2. Add PCI cards
   a. Before extending the PCI card, please save the result (current configuration information) of the prtpicl (1M) command.

```
# prtpicl -v > /tmp/prtpicl.pre <Return>
```

   b. Check the status of the slot.
   Subsequent examples describe extension of PCI cards to the slot "R0B01-PCI#slot02." The "R0B01-PCI#slot02" indicates the I/O cabinet number : 0, the PCI / Disk Box number : 1, physical slot number : 02.
   In the extension of a new redundant system, although two or more PCI cards are extended, whenever you add a PCI card, please perform from procedure "2.b" to "3. Connect PCI cards."
   The relationship of the position of a PCI card and format of "Ap_Id" is shown below. (N: an integral number)

Location of PCI slot	Element	Format of "Ap_Id"
Cabinet of PRIMEPOWER 900/1500/2500	Cabinet Number : **X** System Board Number : **Y** Physical Slot Number : **ZZ**	· **Solaris 8 OE and Solaris 9 OE** pcipsy**N**:C**X**M0**Y**-PCI#slot**ZZ** · **Solaris 10 OE** C**X**M0**Y**-PCI#**ZZ**
PCI / Disk Box	I/O Cabinet Number : **X** PCI / Disk Box Number : **Y** Physical Slot Number : **ZZ**	· **Solaris 8 OE and Solaris 9 OE** pcipsy**N**:R**X**B0**Y**-PCI#slot**ZZ** · **Solaris 10 OE** R**X**B0**Y**-PCI#**ZZ**
other than those above	Physical Slot Number : **ZZ**	· **Solaris 8 OE and Solaris 9 OE** pcipsy**N**:PCI#slot**ZZ** · **Solaris 10 OE** PCI#**ZZ**

   Please confirm that the PCI slot status which extended PCI cards is "empty unconfigured" by using cfgadm (1M) command.

```
# cfgadm | grep R0B01-PCI#slot02 <Return>
pcicsy18:R0B01-PCI#slot02 unknown empty unconfigured unknown
```

   c. To confirm the slot position at extension operation, blink the ALARM LED of Ap_Id displayed in procedure 2.b.

```
# cfgadm -x led=fault,mode=blink pcipsy18:R0B01-PCI#slot02 <Return>
```

   d. Please confirm that READY LED of the PCI bus slot that extends a PCI card has gone out, and extend a PCI card. This operation is performed by our customer support.
   e. Please confirm that the PCI slot status which extended PCI cards is "disconnected unconfigured" by using cfgadm (1M) command.

```
# cfgadm pcipsy18:R0B01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcicsy18:R0B01-PCI#slot02 unknown disconnected unconfigured unknown
```

3. Connect PCI cards
   The cfgadm command is executed with the "configure" option to "Ap_Id," or the push button of the PCI bus slot is pushed. Then a extended PCI card is connected.
   In addition, a push button is valid only in multiple user mode.
   Please confirm that the slot status is "connected configured" by using the cfgadm (1M) command after the above-mentioned procedure.

```
# cfgadm -c configure pcipsy18:R0B01-PCI#slot02 <Return>
# cfgadm pcipsy18:R0B01-PCI#slot02 <Return>
Ap_Id Type Receptacle Occupant Condition
pcipsy18:R0B01-PCI#slot02 pci-pci/hp connected configured ok
```

4. Start the hardware monitoring of the Machine Administration
   Please execute the following command in order to update configuration information, and restart the hardware monitoring of the Machine Administration.

```
# /usr/sbin/FJSVmadm/postphp <Return>
```

5. Connect equipment to PCI cards
   The extended PCI card is connected with network equipment by the cable.
6. Setup driver
   The driver configuration is added by following operations.
   a. The interface name is investigated in order to configure drivers and high layer products.
   Please save the result of the prtcicl (1M) command, and obtain the difference information between current result

and the result taken at "2.a." Then, the driver instance number for the extended PCI card is obtained.
In the following example, since the instance number is 1, it can be determined that the interface name of the extended PCI card is "hme1."

```
# prtpicl -v > /tmp/prtpic.post <Return>
# diff /tmp/prtpicl.pre /tmp/prtpicl.post | more <Return>
:
> :status okay
> :devfs-path /pci@8d,2000/network@1
> :driver-name hme
> :binding-name SUNW,hme
> :bus-addr 1
> :instance 1
> :_class obp-device
> :name network
:
```

b. It confirms that the interface name that obtained above-mentioned procedure is an interface name that corresponds to the PCI bus slot of the added PCI card.
Please carry out this procedure, when it cannot identify relationship between an interface name and PCI bus slot by expanding two or more PCI cards especially.

```
# /usr/sbin/FJSVmadm/inst2comp hme1 <Return>
pcipsy18:R0B01-PCI#slot02
```

c. The configuration of each driver is added.
Please refer to each driver manual for details.

7. Connect to redundant system
Please execute following commands in order to connect the extended PCI card to the existing redundant configuration system.
Notes:
On the NIC switching mode in Redundant Line Control Function, it is impossible to extend a new interface to the existing redundant configuration system. Moreover, when extending an interface on the GS/SURE linkage mode, it is necessary to extend an interface after deactivating the virtual interface (e.g. sha0) used by the GS/SURE linkage mode.

```
Fast switching mode in Redundant Line Control Function
# /usr/sbin/ifconfig hme2 plumb <Return>
# /usr/sbin/ifconfig hme2 IP_address netmask + broadcast + -trailers up <Return>

GS/SURE linkage mode in Redundant Line Control Function
# /opt/FJSVhanet/usr/sbin/stphanet -n sha0 <Return>
# /opt/FJSVhanet/usr/sbin/hanetconfig create -n sha2 -m n -i 192.168.20.10 -t hme2
<Return>
# /opt/FJSVhanet/usr/sbin/hanetnic modify -n sha0 -t sha2,sha3,sha4 <Return>
# /opt/FJSVhanet/usr/sbin/strhanet -n sha0 <Return>

Multipath Function
# /usr/opt/FJSViomp/bin/iompadm -c mpnet add mpnet0 hme2 <Return>
# /usr/opt/FJSViomp/bin/iompadm -c mpnet start mpnet0 hme2 <Return>
```

Notes:
It is necessary to configure the IP address specified by ifconfig(1M) command in /etc/inet/hosts and /etc/hostname.hme1. Unless these are configured, the virtual interface for fast switching mode can not be activated after rebooting the system. In addition, in order to use IPv6 address, please refer to the PRIMECLUSTER GLS (4.1A20 or later) manual.

8. Switch the redundant path
Please switch an online communication path for extended communication path if needed. Please refer to manuals of each redundant configuration software about how to switch a communication path.

Chapter 5 Notes, Restrictions

This chapter describes notes and restrictions in case a PCI card exchanges or extends by using PCI Hot Plug feature.

5.1 Notes

This section describes notes when exchanging and extending PCI cards by using PCI Hot Plug feature.

5.1.1 Network driver configuration changing

In case of configuring parameters in driver.conf(4) file and replacing or extending the PCI card by using the PCI Hot Plug feature, parameters which configured in driver.conf(4) file may not be valid.

To change the initial parameters after the PCI card being replaced or extended by using PCI Hot Plug feature, please refer to the solution of each PCI card shown below. (Each PCI card manual **(*1)** has the description of setting by the ndd command. Please refer it.)

Product ID (Functions)	Software of driver	Resolution
X1033A-U X1033A-X (10/100BASE-T)	Solaris OE(hme)	Please make a setting by the ndd command. Or please reboot a system after changing the /kernel/drv/hme.conf file.
PW008FE1 (10/100BASE-T)	FUJITSU PCI 10/100 Ethernet 1.0 or later (enclosed with a PCI card)	Please make a setting by the ndd command. Or please reboot a system after changing the /kernel/drv/fjfe.conf file.
PW008QE1 (10/100BASE-T x 4)	FUJITSU PCI Quad 10/100 Ethernet 1.0 or later (enclosed with a PCI card)	Please make a setting by the ndd command. Or please reboot a system after changing the /kernel/drv/fjqe.conf file.
PW008QE2 (10/100BASE-T x 4)	FUJITSU PCI Quad 10/100 Ethernet 1.1 or later (enclosed with a PCI card)	
PP028GE1U PP028GE1X (1000BASE-SX)	FUJITSU PCI Gigabit Ethernet 1.4.1 or later (enclosed with a PCI card)	The ndd command is not supported. Please reboot a system after changing the /kernel/drv/fjge.conf file.
PW008GE1U PW008GE1X (1000BASE-T)		
PW008GE4 (1000BASE-SX)	FUJITSU PCI Gigabit Ethernet 2.0 or later (enclosed with a PCI card)	Please make a setting by the ndd command. Or please reboot a system after changing the /platform/sun4us/kernel/drv/fjgi.conf file.
PW008GE5 (10/100/1000BASE-T)		

(*1) In case of X1033A-U(-X), please refer to Sun Microsystems, Inc web page about "Platform Notes: The hme FastEthernet Device Driver" and ndd(1M) man page etc..

5.1.2 Using tape device while PCI Hot Plug operation

By using the PCI Hot Plug feature, a job which uses tape devices may be terminated abnormally.
While using the PCI Hot Plug feature, avoid using tape devices.

5.1.3 Exchanging while using shared device (SCSI interface) for cluster system

If a shared device of non-multipath configuration is connected with a cluster system, there is a possibility that the following WARNING messages are displayed in the node to which the PCI card is not exchanged while exchanging it with which the shared device is connected by the PCI Hot Plug function.

```
scsi: WARNING: /pci@MN,M000/scsi@M,N (xxxx):
Connected command timeout for Target x.x

[Example]
scsi: WARNING: /pci@80,4000/scsi@2,1 (glm2):
Connected command timeout for Target 0.0
```

Or,

```
scsi: WARNING: /pci@MN,M000/scsi@M,N (xxxx):
Disconnected command timeout for Target x.x

[Example]
scsi: WARNING: /pci@80,4000/scsi@2,1 (glm2):
Disconnected command timeout for Target 0.0
```

Or,

```
scsi: WARNING: /pci@MN,M000/scsi@M,N (xxxx):
Disconnected tagged cmd(s) (x) timeout for Target x.x

[Example]
scsi: WARNING: /pci@80,4000/scsi@2,1 (glm2):
Disconnected tagged cmd(s) (1) timeout for Target 0.0
```

Or,

```
scsi: WARNING: /pci@MN,M000/xxxx@M,N/xxxx@M,N (xxxx):
SCSI transport failed: reason 'reset': xxxx

[Example]
scsi: WARNING: /pci@80,4000/scsi@2,1/sd@3,0 (sd20):
SCSI transport failed: reason 'reset': retrying command
```

When these WARNING messages are displayed, the access to the shared device is temporarily interrupted. But the access is retried and restored automatically by the system.

However, there is a possibility that the access is not restored according to some conditions. Please stop the access to the shared device connected with the PCI card during its exchange.

5.1.4 Others

When expanding PCI cards by using PCI Hot Plug feature, it is necessary to install the device driver (case of file devices) and the driver for using the added PCI card.

When extending PCI cards, each driver consumes memory capacity to control PCI cards.

Please refer to the installation guide attached to each PCI card about memory capacity required in order to extend PCI cards, and installation guide of the redundant configuration software about memory capacity required.

5.2 Restrictions

This section describes restrictions when exchanging and extending PCI cards by using PCI Hot Plug feature.

- Please do not exchange or expand PCI cards by using PCI Hot Plug feature during executing Dynamic Reconfiguration (DR).